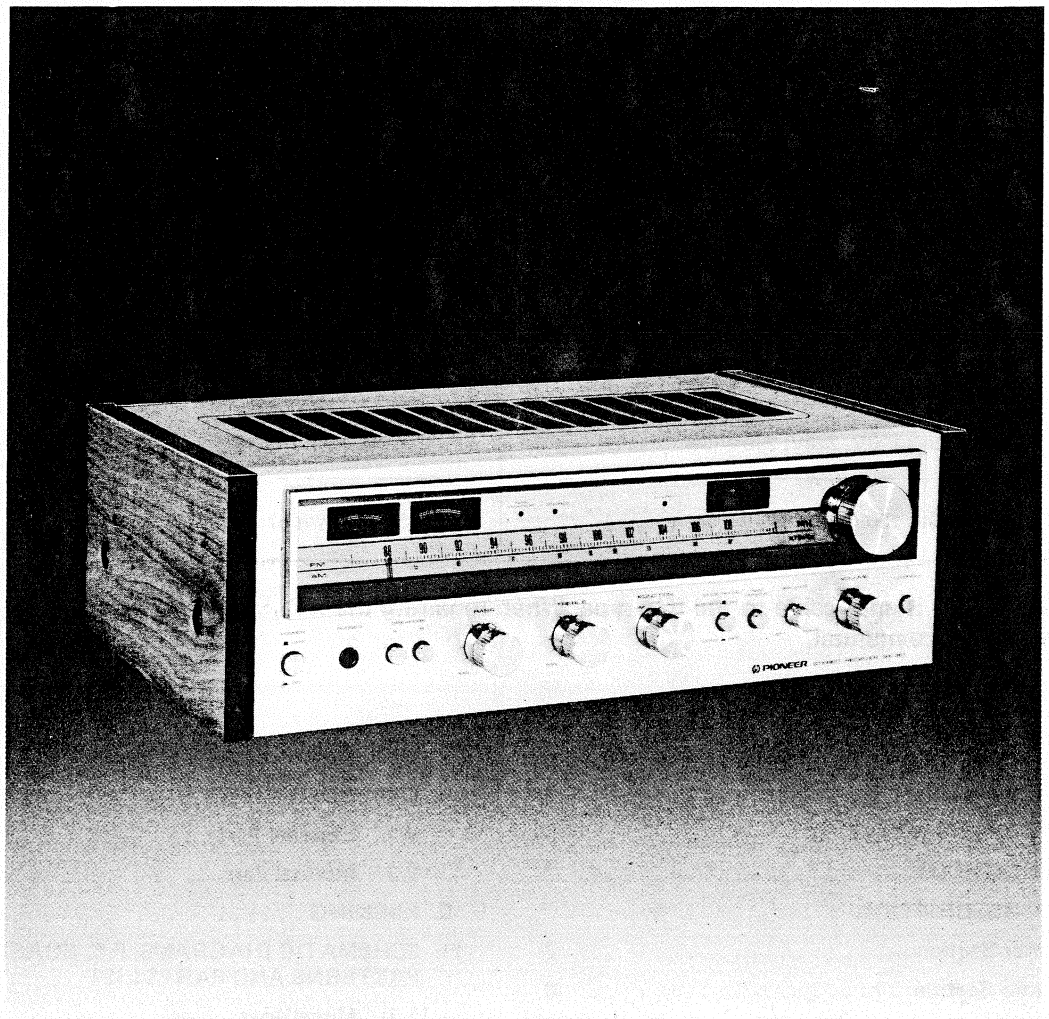
3451



Service Manual

AM/FM STEREO RECEIVER

SX-580

PIONEER®

3451

MODEL SX-580 COMES IN FOUR VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
KC	120V only	Canada model
S	110V, 120V, 220V, 240V (Switchable)	General export model
S/G	110V, 120V, 220V, 240V (Switchable)	U.S. military model

This service manual is applicable to the KU type. When repairing the KC, S, S/G types, please see the additional service manual.

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1. SPECIFICATIONS

Semiconductors

FETs 3
ICs 5
Transistors 17
Diodes 29

Amplifier Section

Continuous Power Output of 20 watts* per channel, min., at 8 ohms or 25 watts per channel at 4 ohms from 20 Hertz to 20,000 Hertz with no more than 0.3% total harmonic distortion.

Total Harmonic Distortion (20 Hertz to 20,000Hertz, from AUX)
- continuous rated power output . . . No more than 0.3%
- 10 watts per channel power output, 8 ohms . . . . . No more than 0.1%
- 1 watt per channel power output, 8 ohms . . . . . No more than 0.08%

Intermodulation Distortion (50 Hertz: 7,000 Hertz = 4:1, from AUX)
- continuous rated power output . . . No more than 0.3%
- 10 watts per channel power output, 8 ohms . . . . . No more than 0.1%
- 1 watt per channel power output, 8 ohms . . . . . No more than 0.08%

Damping Factor (20 Hertz to 20,000 Hertz, 8 ohms) . . 25

Input Sensitivity/Impedance
- PHONO . . . . . 2.5mV/50 kilohms
- AUX . . . . . 150mV/50 kilohms
- TAPE PLAY . . . . . 150mV/50 kilohms

PHONO Overload Level (1kHz, T.H.D.: 0.1%) . . . 150mV

Output (Level/Impedance)
- TAPE REC 150mV
- SPEAKERS . . . . . A, B, A+B
- HEADPHONES . . . . . Low impedance

Frequency Response
- PHONO(RIAA Equalization) . 30Hz to 15,000Hz ±0.5dB
- AUX, TAPE PLAY . . . . . 5Hz to 100,000Hz ±3dB

Tone Control
- BASS . . . . . +8dB, −8dB (100Hz)
- TREBLE . . . . . +10dB, −10dB (10kHz)

Loudness Contour (Volume control set at −40dB position) . . . . . +6dB (100Hz), +3dB (10kHz)

Hum and Noise (IHF, short-circuited, A network, rated power)
- PHONO 73dB
- AUX, TAPE PLAY 90dB

FM Section

Usable Sensitivity
- MONO 10.8dBf (1.9μV)

50dB Quieting Sensitivity
- MONO 16.7dBf (3.8μV)
- STEREO 36.7dBf (38μV)

Signal-to-Noise Ratio at 65dBf
- MONO 80dB
- STEREO 70dB

Distortion at 65dBf
- 100Hz . . . MONO 0.07%
- STEREO 0.15%
- 1kHz . . . MONO 0.07%
- STEREO 0.15%
- 6kHz . . . MONO 0.2%
- STEREO 0.25%

Frequency Response . . . . . 30Hz to 15,000Hz $^{+0.2}_{-1.0}$ dB
Capture Ratio 1.0dB
Selectivity 60dB
Spurious Response Ratio 65dB
Image Response Ratio 65dB
IF Response Ratio 90dB
AM Suppression Ratio 50dB
Muting Threshold 19.2dBf (10μV)
Stereo Separation . . . . 40dB (1kHz), 30dB (30Hz~15kHz)
Subcarrier Production Ratio 50dB
SCA Rejection Ratio 65dB
Antenna Input . . . . . 300 ohms balanced
75 ohms unbalanced

AM Section

Sensitivity (IHF, ferrite antenna) 300μV/m
(IHF, ext. antenna) 15μV
Selectivity 26dB
Signal-to-Noise Ratio 50dB
Image Response Ratio 40dB
IF Response Ratio 40dB
Antenna . . . . . Built-in ferrite loopstic antenna

Miscellaneous

Power Requirements 120V, 60Hz
Power Consumption . . . . . 80W (UL), 160VA (CSA)
Dimensions . . . . . 435(W) x 144.5(H) x 314(D) mm
17-1/8(W) x 5-5/8(H) x 12-3/8(D) in
Weight . . . . . Without package: 8.3kg (18lb 5oz)
With package: 9.7kg (21lb 6oz)

Furnished Parts

FM T-type antenna 1
Operating instructions 1

**Measured pursuant to Federal Trade Commission's Trade Regulation Rule on Power Output Claims for Amplifiers.*

NOTE:
Specifications and design subject to possible modification without notice due to improvements.

2. FRONT PANEL FACILITIES

POWER METERS

These meters allow you to read out the rated power level when speakers with a nominal impedance of 8 ohms are connected to the receiver's speaker terminals.

NOTE:
These values are related to the impedance of the speakers and they vary according to the frequency. In order to find out the exact output level, connect an 8-ohm dummy load instead of the speakers.

TAPE MONITOR INDICATOR

With the TAPE MONITOR switch set to ON, the TAPE MONITOR indicator lights up. This lamp indicates the receiver is monitoring or playing back the tape on the tape deck connected to the TAPE jacks.

SOURCE INDICATOR

With the TAPE MONITOR switch set to OFF, the SOURCE indicator lights up. This lamp indicates the receiver is playing the program source; AM broadcasting, FM broadcasting, record on the turntable, or another component connected to the AUX jacks.

DIAL POINTER

This pointer indicates the broadcasting stations.

STEREO INDICATOR

This indicator lights up when the receiver is tuned in to receive a stereo broadcast.

AM/FM TUNING METER

When tuning in to FM stations, position the meter pointer in the center of FM area for optimum reception. In the case of AM stations, tune for maximum meter deflection toward the right of the scale.

TUNING KNOB

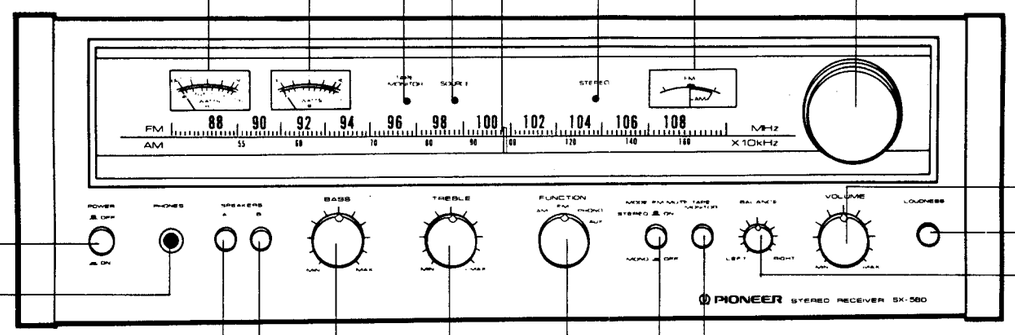
Use this to tune in to broadcasting stations.
Select the station and tune for optimum reception by observing the dial scale and the AM/FM tuning meter.

VOLUME CONTROL

Use this control to adjust the output level to the speakers and headphones. Turn it clockwise to increase the output level. No sound will be heard if you set it to MIN.

POWER SWITCH

Depress this button (in the ON position) to supply power to the receiver. There will be a short delay when it is set to ON, because the muting circuit has been actuated to suppress the unpleasant noise that is sometimes generated when the power is switched on and off.



LOUDNESS SWITCH

Depress this button (ON position) when listening at a low volume. The frequency response of the human ear varies according to the listening volume, and setting this switch to the ON position compensates for hearing response by emphasizing the bass and treble.

PHONES JACK

Plug the headphones into this jack when you want to listen through your stereo headphones.
Release both SPEAKERS buttons if you want to listen to the sound through your headphones only (This means that both buttons will be released).

BALANCE CONTROL

Use this control to balance the volume of the left and right channels. First, however, set the mode select switch (MODE/FM MUTE) to MONO. If the sound appears to be louder on the right, it means that the volume of the right channel is higher. Turn the BALANCE control to the left and adjust. Conversely, if the sound appears to be louder on the left, it means that the volume of the left channel is higher. Therefore, turn the BALANCE control to the right and adjust. After adjusting, return the mode select switch (MODE/FM MUTE) to STEREO.

SPEAKERS SWITCHES

Depress the button corresponding to the speakers connected to the SPEAKERS terminals (A or B) on the rear panel. You can depress both of these buttons to listen to sound from two pairs of speaker systems at the same time.

BASS AND TREBLE CONTROLS

Use these controls to adjust the bass and the treble. If you turn the BASS control to the right from its center position, you will be able to emphasize the sound in the low-frequency range. Conversely, turning this control left from the center position will attenuate the sound.
You can use the TREBLE control to adjust the sound in the high-frequency range.

FUNCTION SWITCH

Use this switch to select the program source. For a second after the switch is selected, no sound will be heard. This is due to the operation of the muting circuit, which suppress the unpleasant switching noise generated when the FUNCTION switch is selected.

AM: When listening to AM broadcasting.
FM: When listening to FM broadcasting.
The STEREO indicator lights up when the receiver is tuned in to an FM stereo broadcast.
PHONO: When playing a record on the turntable connected to the PHONO jacks.
AUX: When listening to an audio component connected to the AUX jacks.

MODE/FM MUTING SWITCH

This switch is a combination of the FM muting switch and the mode select switch. When the button is left undepressed (ON position) the reproduction is in STEREO mode, while the FM muting function acts to suppress unpleasant interstation noise while tuning between FM stations when listening to FM broadcasting. When the button is depressed (OFF position), however, reproduction is in MONO mode, while the FM muting function does not act, thus enabling suitable reception of weak radio stations when tuning in to the FM broadcasting station.

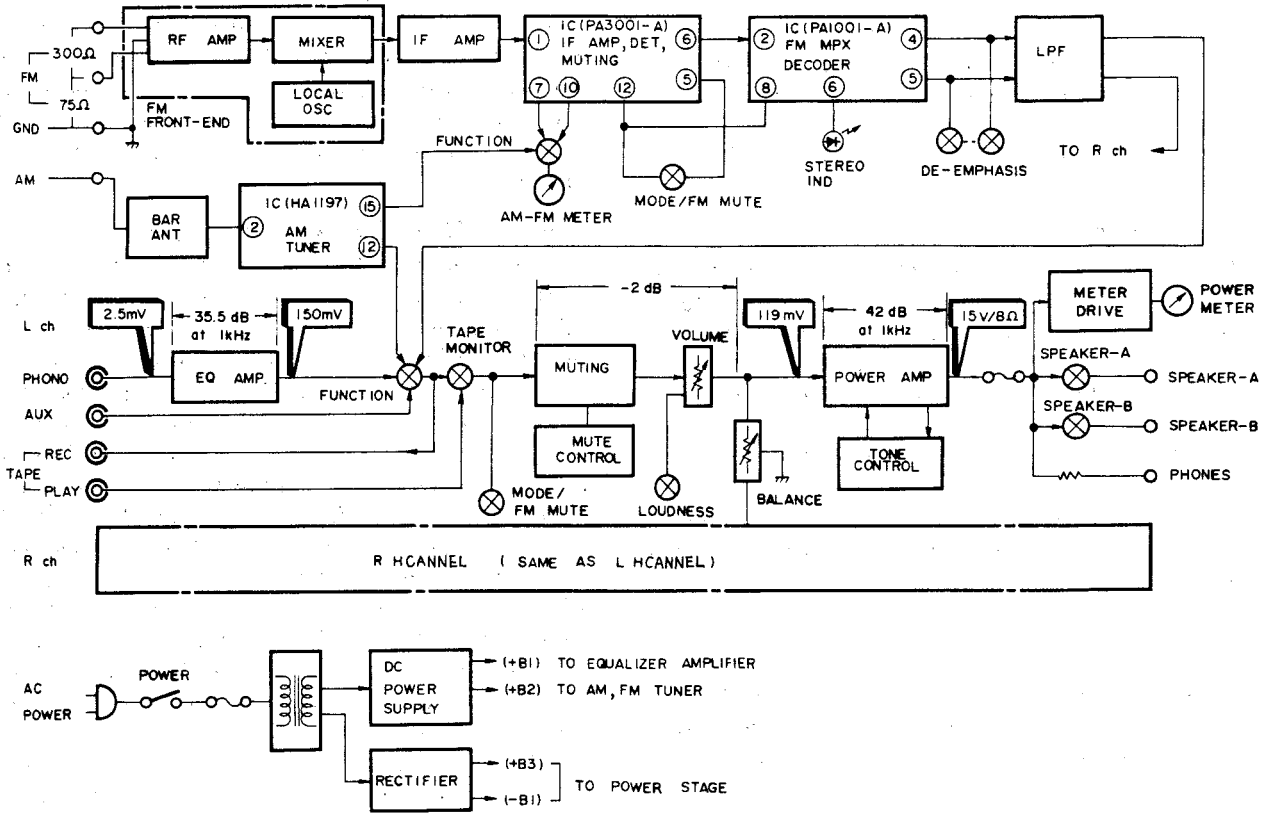
NOTE:
Recording stereophonically with the mode select switch (MODE/FM MUTE) in the MONO position may cause deterioration in channel separation.

TAPE MONITOR SWITCH

Depress this button with a tape deck which is connected to the TAPE jacks (REC and PLAY) when you want to monitor the playback or recording of a tape. When you depress this button the TAPE MONITOR indicator will come on.

NOTE:
Release this button (OFF position) when listening to a record or a broadcast. The SOURCE indicator lights up at this time.

3. BLOCK DIAGRAM



4. CIRCUIT DESCRIPTION

4.1 TUNER SECTION

AM Tuner

The AM tuner stage consists of a 2-ganged tuning capacitor, an IC (HA1197) and a ceramic filter. See page 21 for details of the internal structure of HA1197 which contains a 1-stage RF amplifier, converter, 2-stage IF amplifier, detector, and AGC circuit.

FM Front-end

The FM front-end consists of a 3-ganged tuning capacitor, a dual-gate MOS FET equipped 1-stage RF amplifier, a local oscillator and a mixer. The output of the local oscillator (a modified Clapp circuit employing a single transistor) is applied to the base of the mixer transistor.

IF Amplifier and Detector

This stage is made up of one IC, one transistor, are two dual-element ceramic filters. The NPN transistor inserted between the filters is employed for IF amplifier impedance matching purposes. The IC (PA3001-A) in the following stage incorporates IF amplifiers, quadrature detector, meter drive and FM muting circuit, etc. See the block diagram on page 21 for the internal structure of this IC.

Multiplex Decoder

The sub-carrier generator (PLL system), NFB demodulator, automatic pilot canceller, and stereo/mono automatic switch are also built from an IC (PA1001-A). With the addition of a few CR elements, a multiplex decoder of high SN ratio and low distortion has been achieved (Again, refer to page 21 for further details of this IC). A major feature of the PA1001-A is the automatic pilot canceller. This circuit detects the level of the 19kHz pilot signal, and automatically adjusts to that level to cancel out the pilot signal completely. This has made the designing of the low-pass filter in the following stage very much easier, and has further extended the frequency response at the high end.

The output signal from the multiplex decoder is passed on via the de-emphasis circuit and AF amplifier (which serves as both low-pass filter and crosstalk canceller) to the FUNCTION switch.

4.2 AUDIO SECTION

Equalizer Amplifier

The phono equalizer amplifier is a collector-to-emitter feedback-type 2-stage direct-coupled amplifier, designed with a gain of 35.5dB (1kHz), a phono overload level of 150mV (1kHz, THD 0.1%), and equalizer deviation of ±0.5dB (30Hz—15kHz).

Power Amplifier

The power amplifier, which includes a hybrid IC (STK-0029) in the power stage, is a first-stage differential amplifier all-stage direct-coupled OCL circuit. This IC features an inverted Darlington connection quasi-complementary circuit power stage integrated with the bias circuit. The output power obtainable with an 8-ohm load is 20 watts (20—20,000Hz, THD 0.3%).

The tone controls (BASS, TREBLE) are operated by changing the frequency response of the power amplifier NFB circuit.

Output Meter Drive Circuit

Fundamentally, this circuit is the same as those employed in the SA-7700 and the SA-6700. A wide meter range is obtained by compressing the dynamic range of the output signal by taking advantage of the initial portion of the diode $V_F - I_F$ relation.

Audio Muting Circuit

The FET gate circuit connected to the input of the power amplifier stage serves as a muting circuit which eliminates unwanted switching noises when the power supply is turned on and off and when the FUNCTION selector is used. The circuitry involved and the voltage changes at different points are shown in Figs. 1 & 2.

- **When the power supply is turned ON**

Since $-B_2$ is applied to the base of Q_2 very quickly, this transistor will remain off when the power supply is first turned on. And, since the $-B_1$ level is established more rapidly than the $+B_2$ level, the potential at point A will initially be lowered to the $-B_1$ level, thereby keeping the FET switched off, and preventing the application of any signal to the input of the power amplifier stage (i.e. the signals are muted during this period).

As the $+B_2$ level is gradually established, the potential of point A will also increase in response, resulting in the FET being turned on some 6 seconds later to terminate the muted condition.

- **When the power supply is turned OFF**

The $-B_2$ voltage level diminishes relatively rapidly, and Q_2 is turned on by the forward biasing (because $-B_1$ diminishes rather slowly). Consequently, the potential at point A is reduced to $-B_1$, and the FET is turned off. This muting status is achieved within 0.1 second after the power supply is turned off.

- **When FUNCTION selector is operated**

When the FUNCTION selector switch is at any of the selector positions, Q_1 will remain off due to $+B_1$ being applied to its base via the FUNCTION switch. But since this is a non-shorting type selector switch, the $+B_1$ being applied to the base of Q_1 will be interrupted whenever the position of the selector switch is changed. Both Q_1 and Q_2 will thus be turned on temperarily. As a result, the potential at point A will be reduced to $-B_1$, followed by the FET being turned off and the power amplifier stage being muted. However, once the FUNCTION selector switch has been completely switched to the next position, $+B_1$ will again be applied to the base of Q_1, resulting in Q_1 and Q_2 being turned back off. The potential at point A will consequently increase (at a speed determined by the R_1, C_1 time constant) until the FET is turned on, and the muting condition terminated.

Note that when the TAPE MONITOR switch is ON, Q_1 will be disconnected from Q_2, so the power amplifier stage will no longer be muted when the FUNCTION selector is operated.

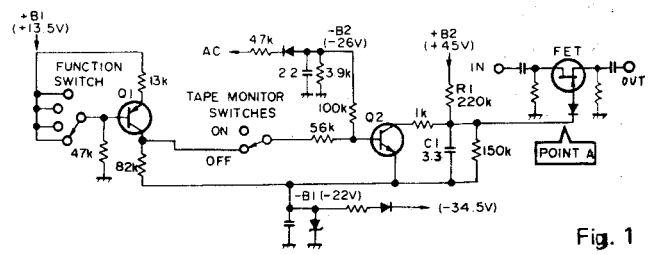


Fig. 1

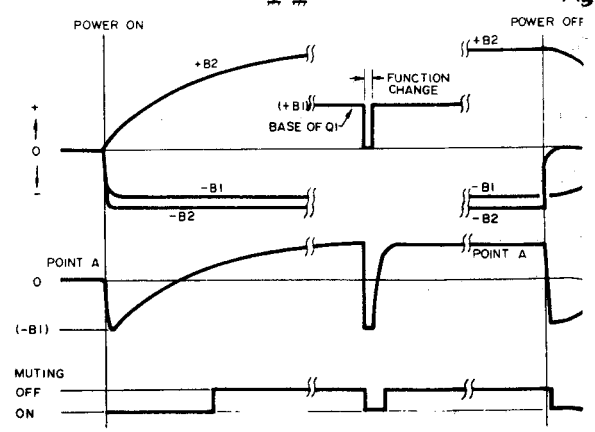


Fig. 2

5. DISASSEMBLY

Wooden Cover

Remove the 4 screws (❶-❹).

Bottom Plate

Remove the 10 screws (❺-⓮).

Front Panel

Pull off all the knobs, and remove the 2 screws (⓯, ⓰) and 2 nuts (⓱, ⓲).

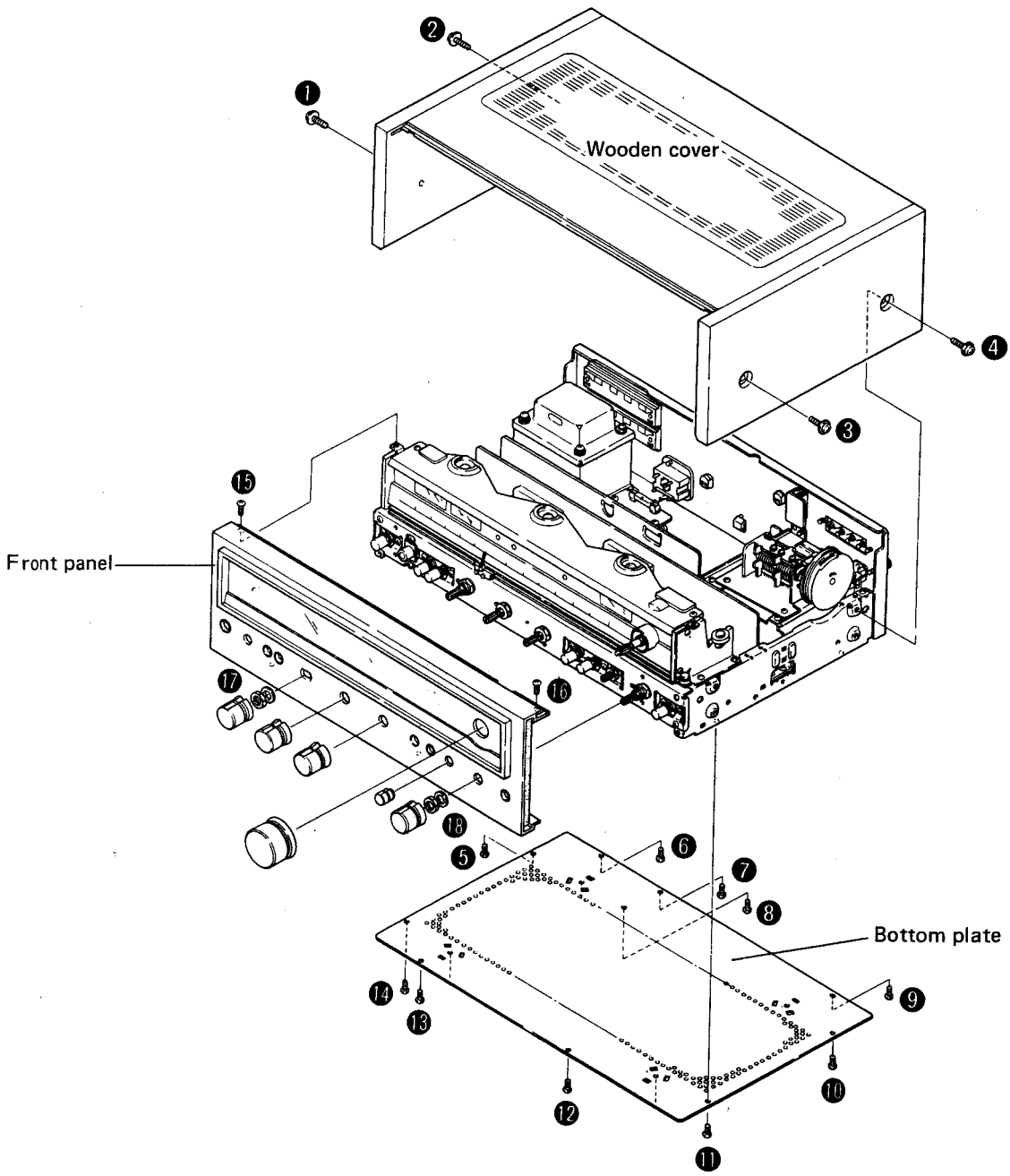
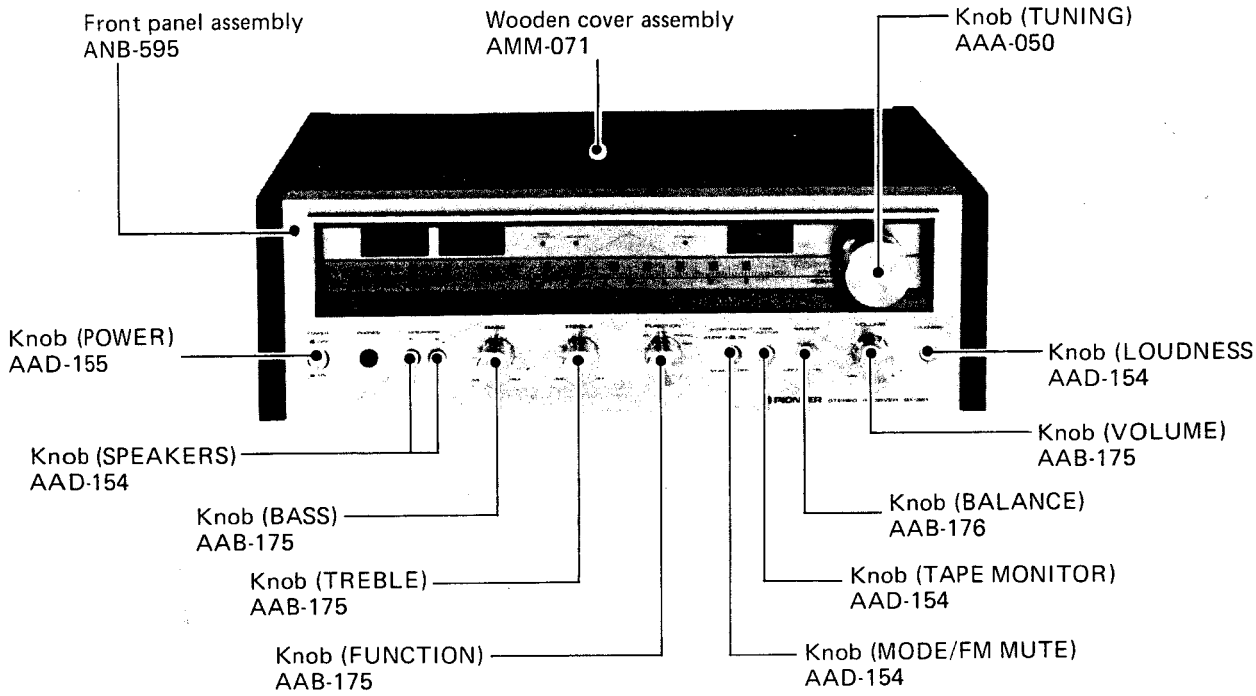


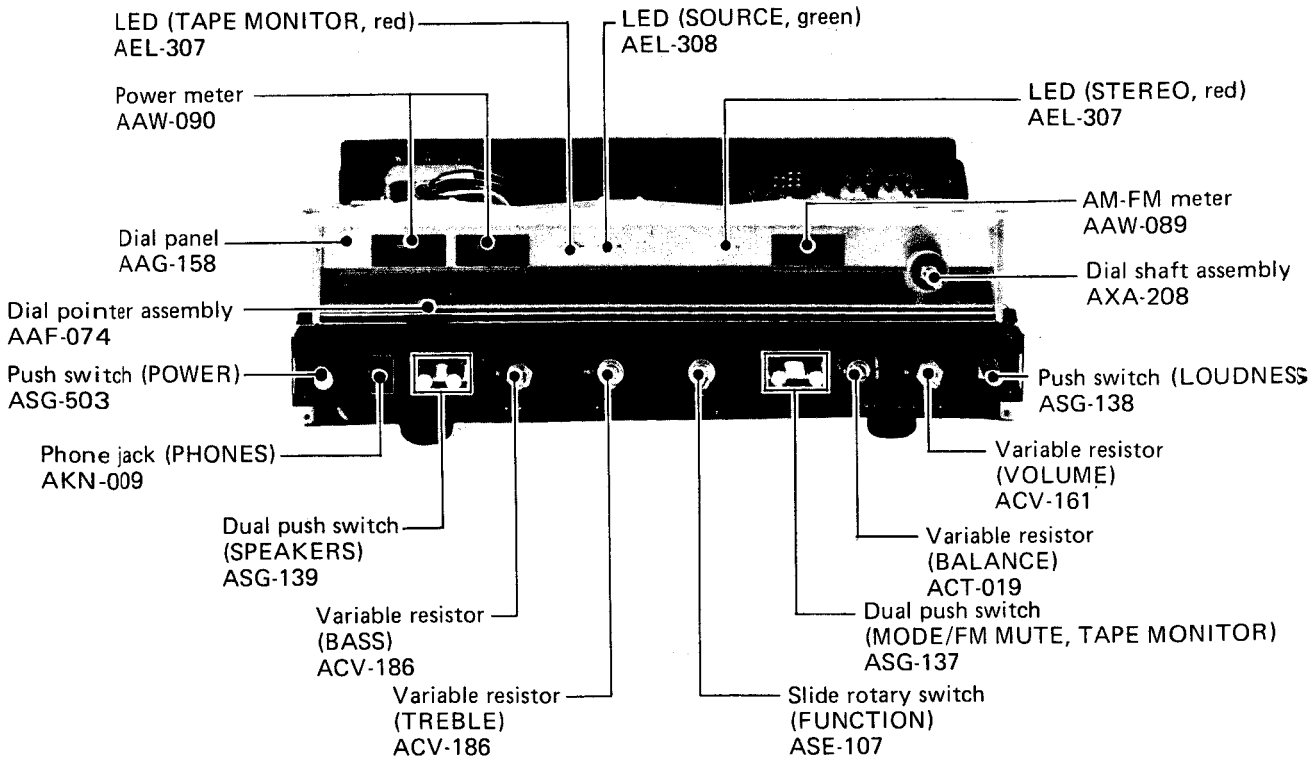
Fig. 3

6. PARTS LOCATIONS

6.1 FRONT PANEL VIEW



6.2 FRONT VIEW WITH PANEL REMOVED



5. DISASSEMBLY

Wooden Cover

Remove the 4 screws (❶-❹).

Bottom Plate

Remove the 10 screws (❺-⓮).

Front Panel

Pull off all the knobs, and remove the 2 screws (⓯, ⓰) and 2 nuts (⓱, ⓲).

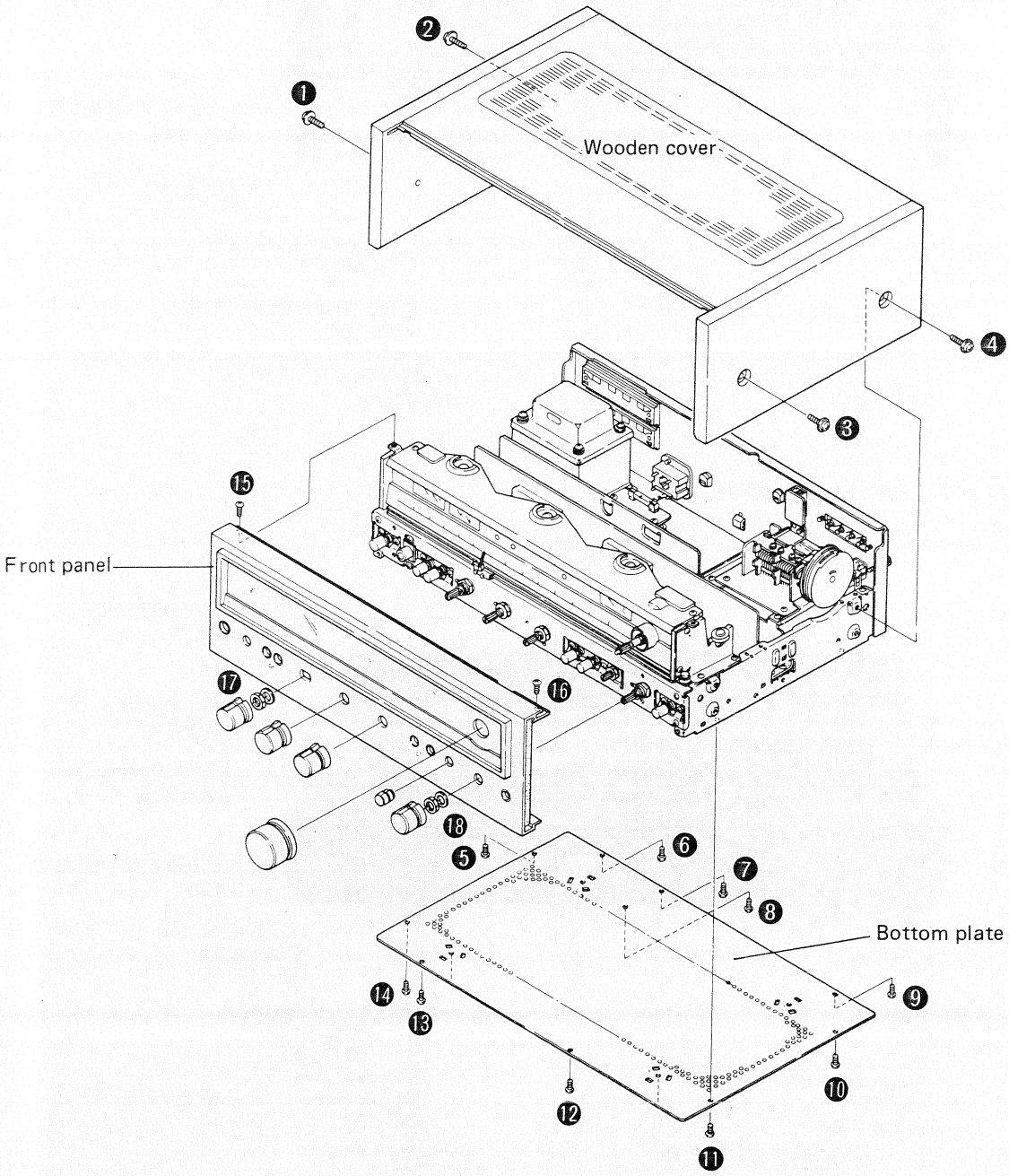
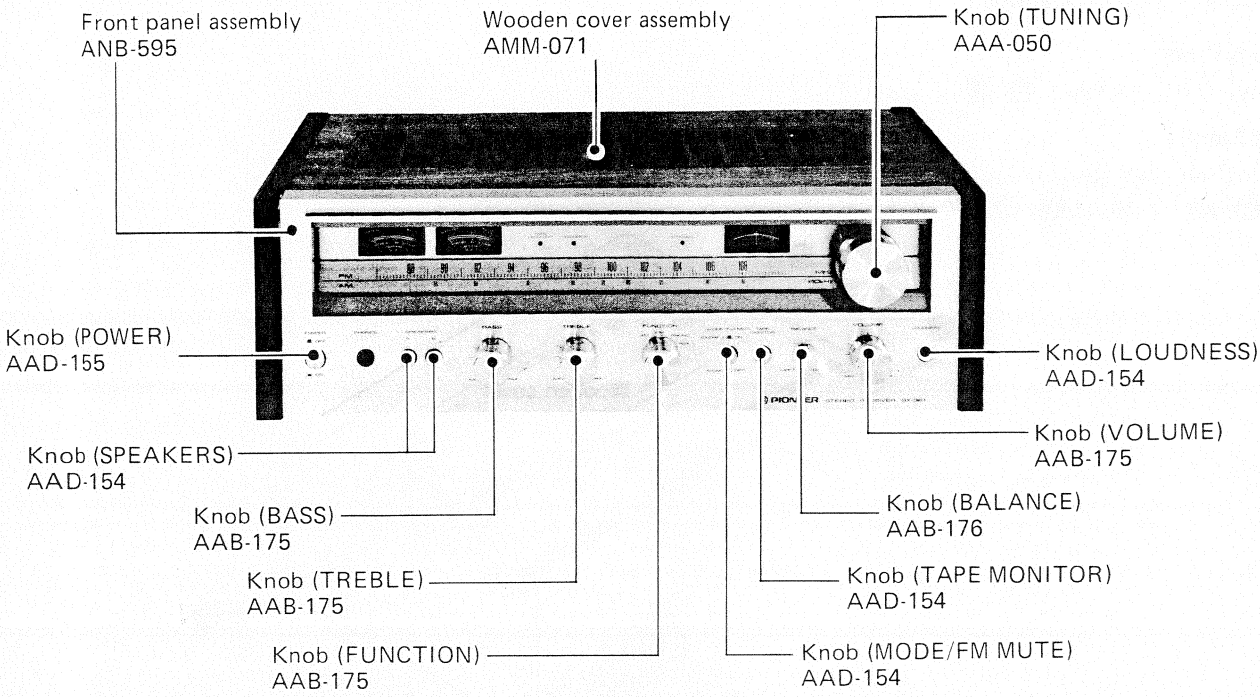


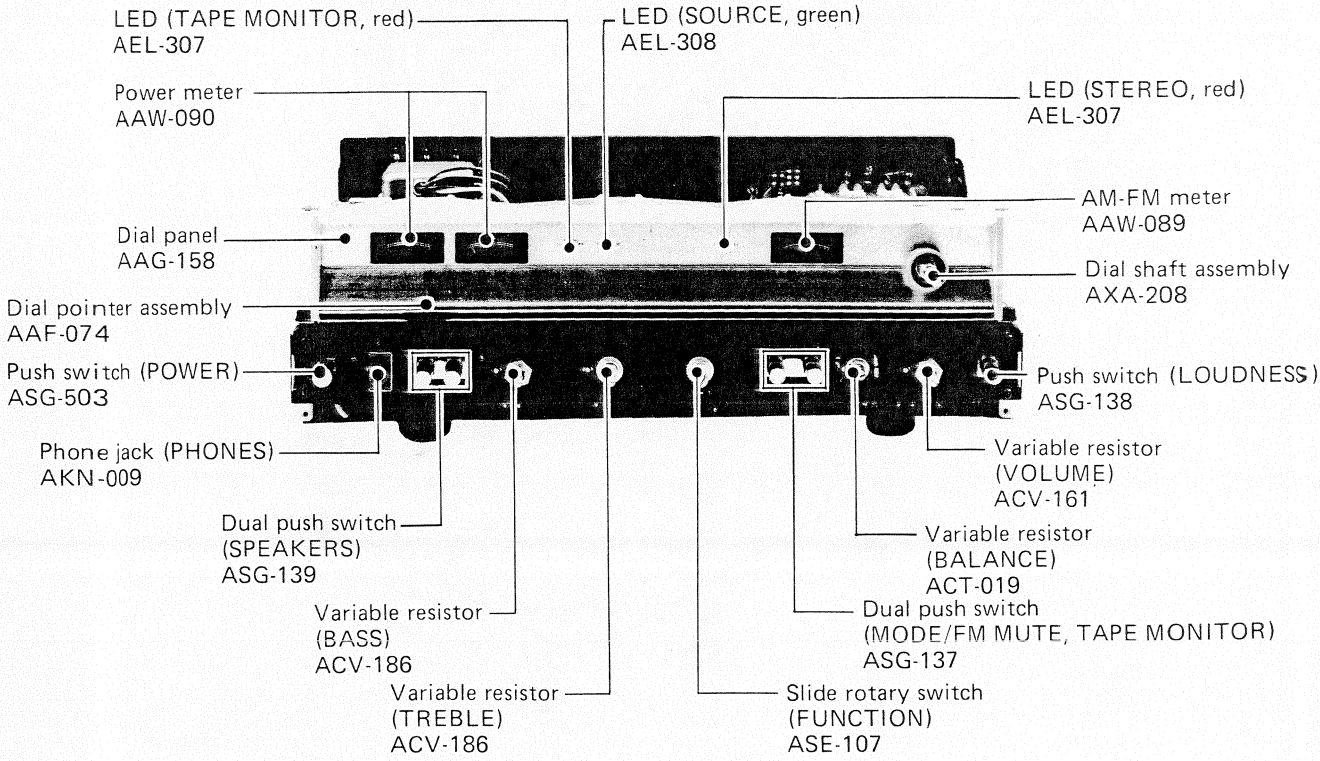
Fig. 3

6. PARTS LOCATIONS

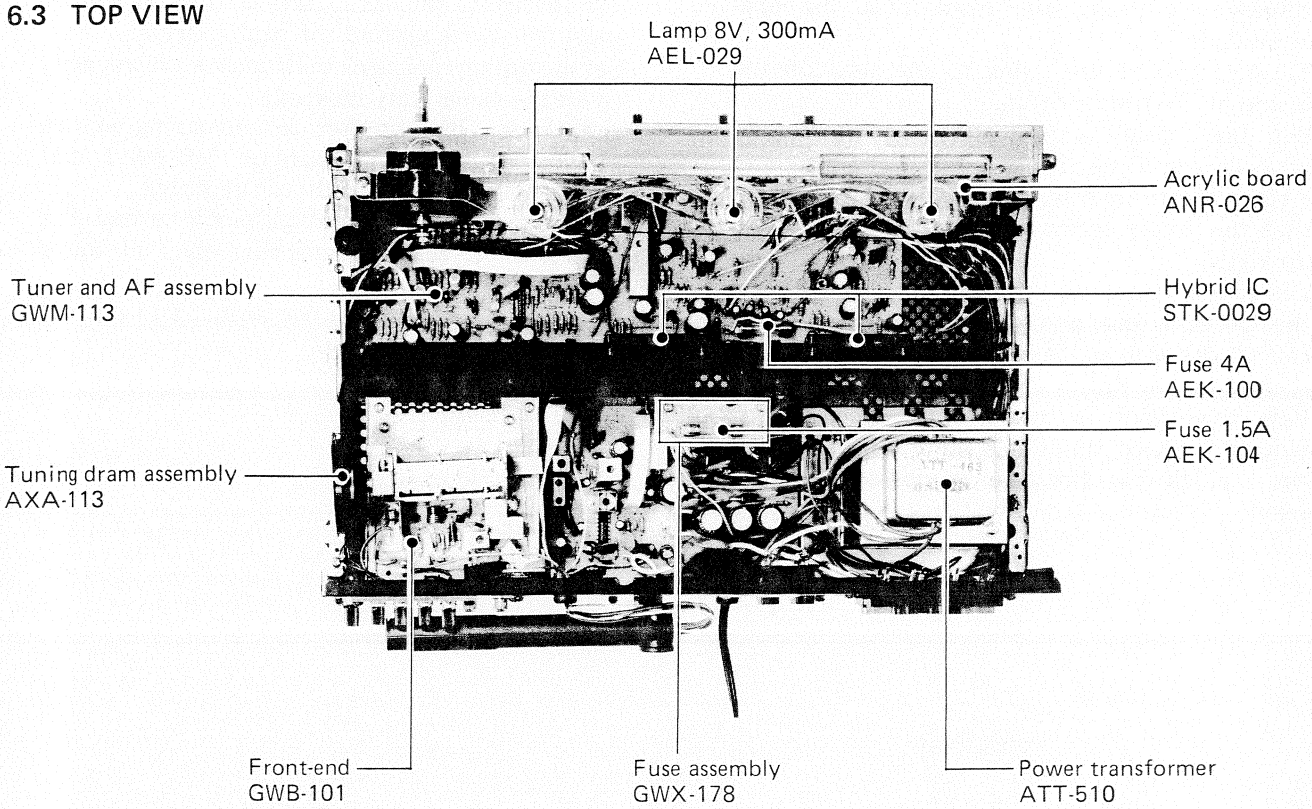
6.1 FRONT PANEL VIEW



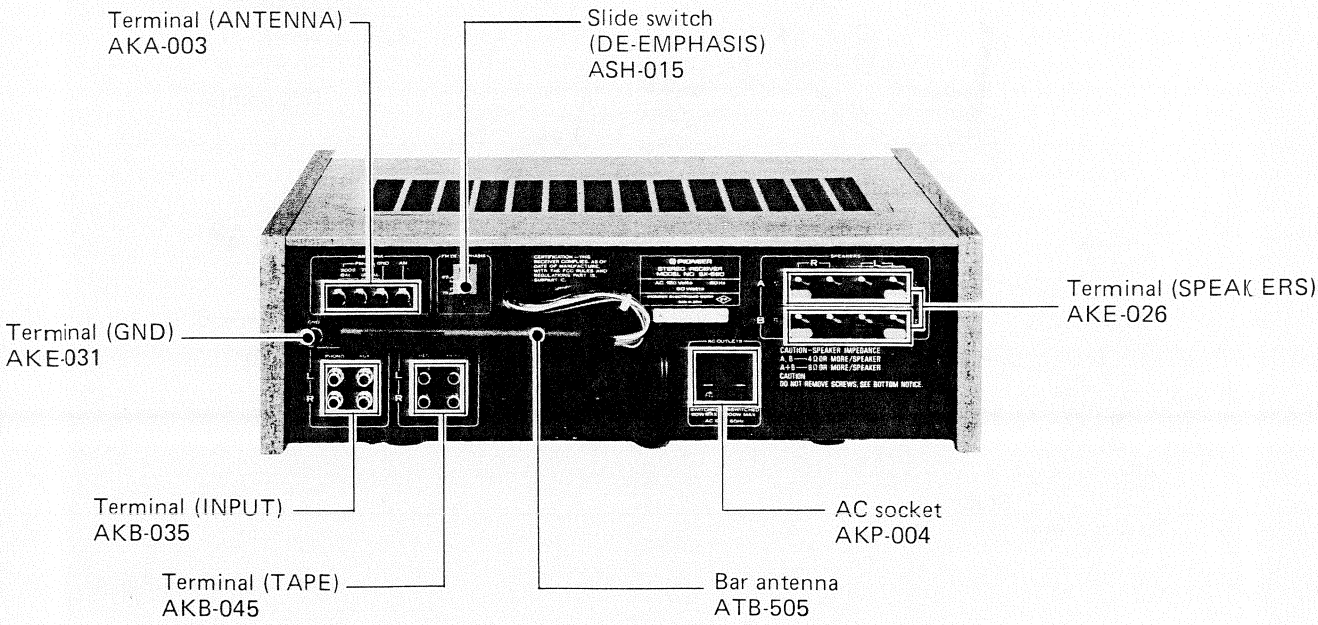
6.2 FRONT VIEW WITH PANEL REMOVED



6.3 TOP VIEW



6.4 REAR PANEL VIEW



7. DIAL CORD STRINGING

1. Remove front panel (See page 9).
2. Remove the tuning drum from the tuning capacitor shaft.
3. Tie one end of the string to the stud on the inside of the tuning drum.
4. Set the tuning capacitor to its maximum capacity (with the vanes fully meshed).
5. Attach the tuning drum to the tuning shaft so that the fixing screw head is pointing exactly upwards.
6. Draw the string out through the gap cut in the tuning drum, and after passing it half-way round the drum, thread it successively over the pulleys A, B, C.
7. Pass the string over pulley D after having wound it three times around the tuning shaft (in a clockwise direction as viewed from the rear).
8. Tie the other end of the string to the hook on the spring, so that the string is tensioned, after passing it twice around the tuning drum.
   Set the tuning capacitor to its maximum capacity (with the vanes fully meshed).
9. Attach the dial pointer to the string at the start point (at the extreme left-hand dial scale), and secure it firmly to the string.
10. Check that when the tuning shaft is turned, the dial pointer, tuning capacitor, etc., all move smoothly.
11. Paint-lock the knots on the string, and cut off the excess after painting.

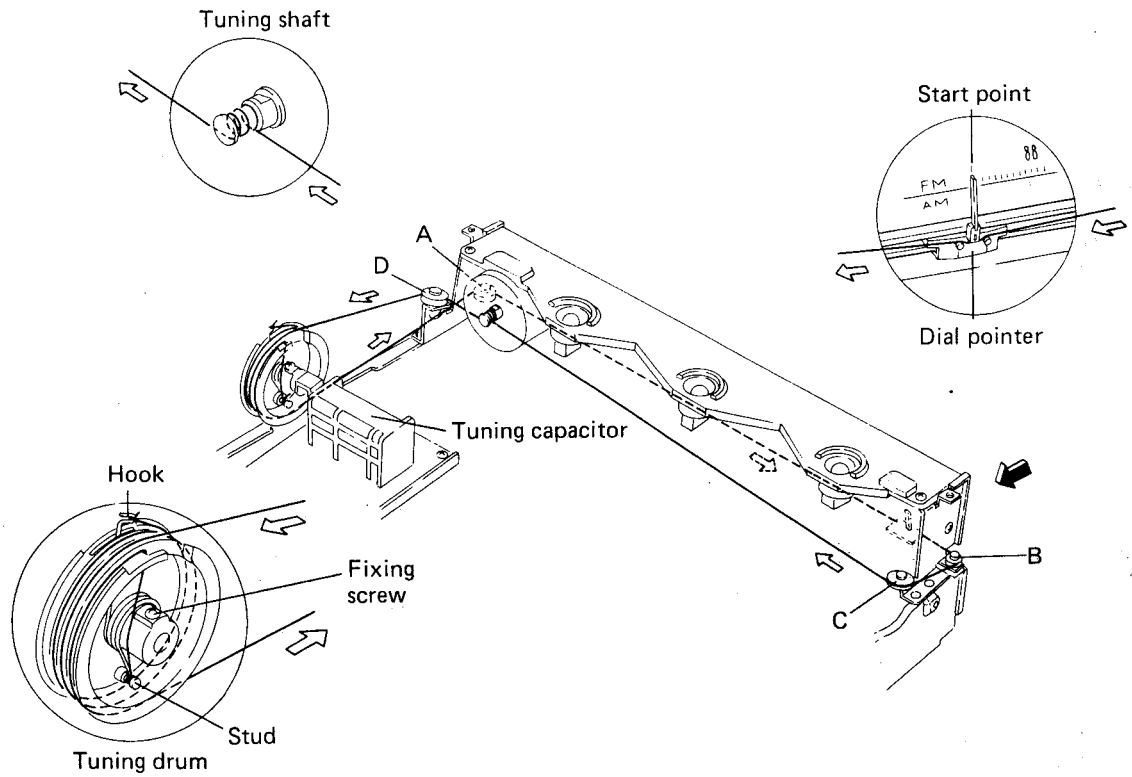


Fig. 4

8. ADJUSTMENTS

8.1 AM TUNER

1. Connect up the test instruments as shown in Fig. 5.
2. Set the FUNCTION switch to AM.
3. Set AM Signal Generator (AM SG) for 400Hz 30% modulation 100dB output.
4. Set the SX-580 dial indication and AM SG frequency for 600kHz.
5. Adjust T_3 core for maximum reading on AC voltmeter.
6. Set the SX-580 dial indication and AM SG frequency for 1400kHz.
7. Adjust TC_4 for maximum reading on AC voltmeter.
8. Set AM SG for 30dB output.
9. Set the SX-580 dial indication and AM SG frequency for 600kHz.
10. Adjust T_3 and bar antenna core for maximum reading on AC voltmeter.
11. Set the SX-580 dial indication and AM SG frequency for 1,400kHz.
12. Adjust TC_5 and TC_4 for maximum reading on AC voltmeter.
13. Repeat steps 9 to 12, alternately until adjustment at the one frequency requires no further re-adjustment at the other frequency.
14. Adjust F_4 core for give the maximum reading on the AC voltmeter.

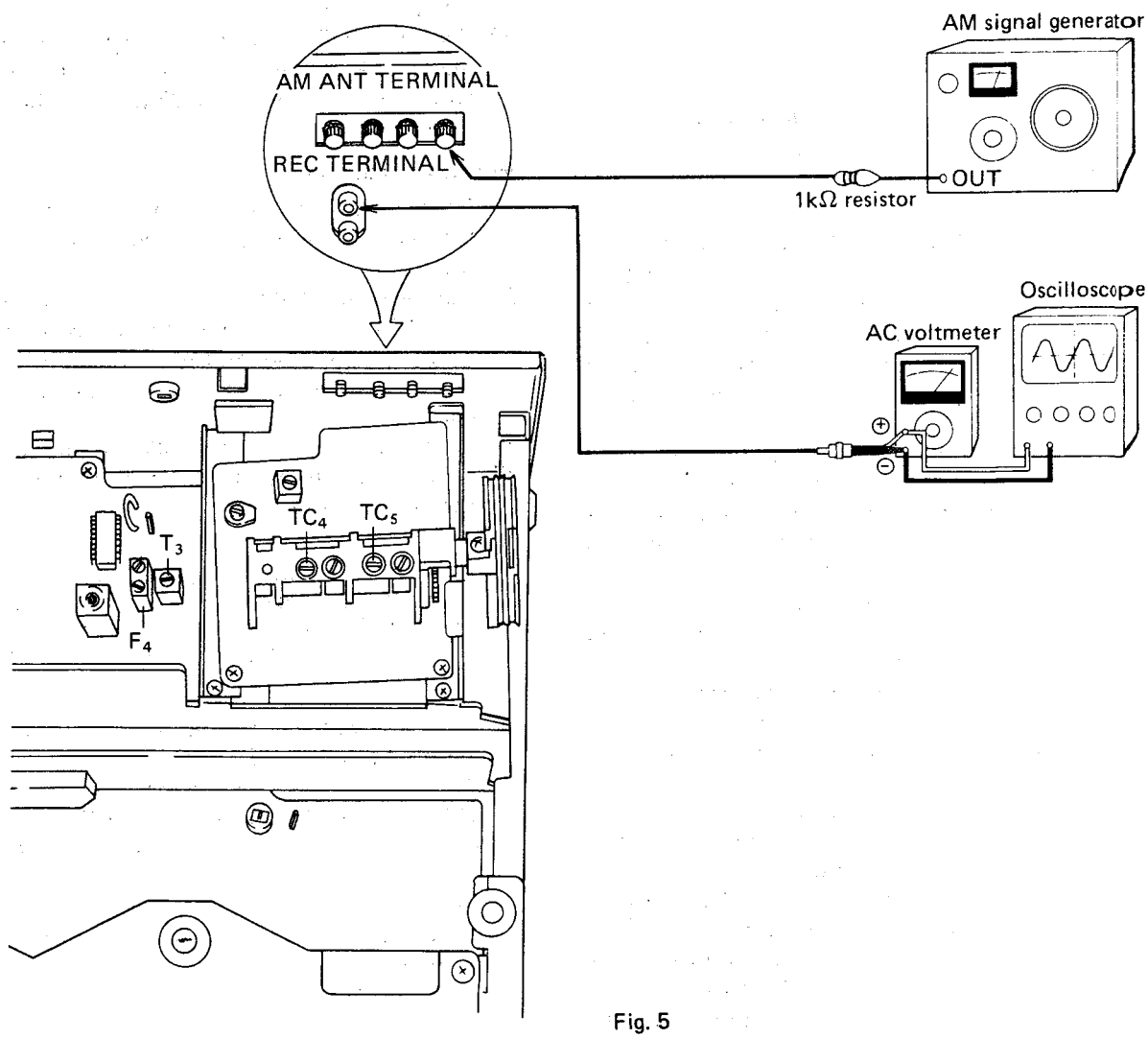


Fig. 5

8.2 FM TUNER

The tuning coil in the FM front end does not have an adjusting core. Consequently, tracking adjustments at 90MHz are performed by regulating the gap between rotor and stator of the tuning capacitors (VC_1, VC_2, VC_3). The expression adjust VC_1, (VC_2, VC_3) found in the text means that the two outer rotor blades of each of these tuning capacitors are to be extended outwards with spatula (Part No. GGK-066) as shown in Fig. 6.

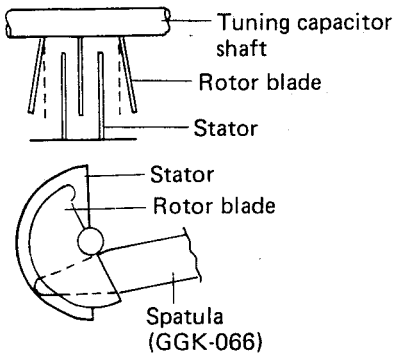


Fig. 6 Adjustment of Tuning Capacitor

1. Connect up the test instruments as shown in Fig. 7.
2. Set the FUNCTION switch to FM.
3. Turn the MODE/FM MUTE switch to OFF.
4. Set the dial pointer of the SX-580 to 106MHz.
5. Set the FM Signal Generator (FM SG) output to 106MHz at 106dB, with 100% modulation (75kHz deviation) for 400Hz. This modulation setting should be used for all the following adjustments.
6. Adjust TC_3 to give the maximum reading on the multitester (with DC 200μA range).
7. Adjust the primary (lower) core of T_2 so that the AM-FM meter (the FM tuning meter) indicator needle reads dead center.
8. Set the FM SG output to 15dB.
9. Adjust TC_1 and TC_2 to give the maximum reading on the multitester.
10. Set the SX-580 dial pointer to 90MHz.
11. Set the FM SG output to 90MHz at 106dB.
12. Adjust VC_3 for maximum reading on the multitester.
13. Set the FM SG output to 15dB.
14. Adjust VC_1 and VC_2 so that the multitester reading reaches a maximum.
15. Repeat the adjustments of VC_3, VC_1 and VC_2 when the dial pointer is at 90MHz, and of TC_3, TC_1 and TC_2 when the dial pointer is at 106MHz, alternately until adjustment at the one frequency requires no further re-adjustment at the other frequency.
16. Adjust the core of T_1 to give the maximum reading on the multitester.
17. De-tune the SX-580 (to a position at which only inter-station noise is heard), and adjust the primary (lower) core of T_2 so that the AM-FM meter indicator needle reads at dead center.
18. Set the FM SG output to 98MHz at 66dB.
19. Tune the SX-580 to a dial reading of 98MHz observe that the AM-FM meter is reading correctly at the center of the meter scale.
20. Adjust the secondary (upper) core of T_2 to give a minimum level of distortion.
21. Repeat the steps detailed in section 17 to 20 for the adjustment of the primary and secondary cores of T_2 until both requirements are fully met.
22. Set the SX-580 dial indication and FM SG frequency for 98MHz.
23. Set the MODE/FM MUTE switch to the ON, and check the muting threshold. If the muting threshold is more than 28dB, cut the jumper lead A.

Multiplex Decoder

24. Connect a MPX Signal Generator (MPX SG) to the external modulator terminals of the FM SG.
25. Connect the 19kHz pilot output signal from the MPX SG to the X-plates (horizontal input) of an oscilloscope, and use a probe to connect the Y-plates (vertical input) to the TP_2 terminal.
26. Set the FM SG output to 66dB, unmodulated.
27. Adjust VR_1 to freeze motion of the resulting Lissajous' figure.

NOTE:
Lissajous' figure adopts the general form shown in Figure 8 due to the fact that the MPX SG 19kHz pilot signal output is a sine wave, and the TP_2 terminal carries a 76kHz saw tooth wave as determined by the adjustment of VR_1.

28. Turn the FM SG modulation mode setting to external modulation.
29. Adjust the MPX SG modulation settings to 1kHz, L + R, 90% modulation (67.5kHz deviation), with 10% pilot modulation (7.5kHz deviation).
30. Adjust the core of T_1 for minimum distortion in the 1kHz demodulated output from L or R channel.

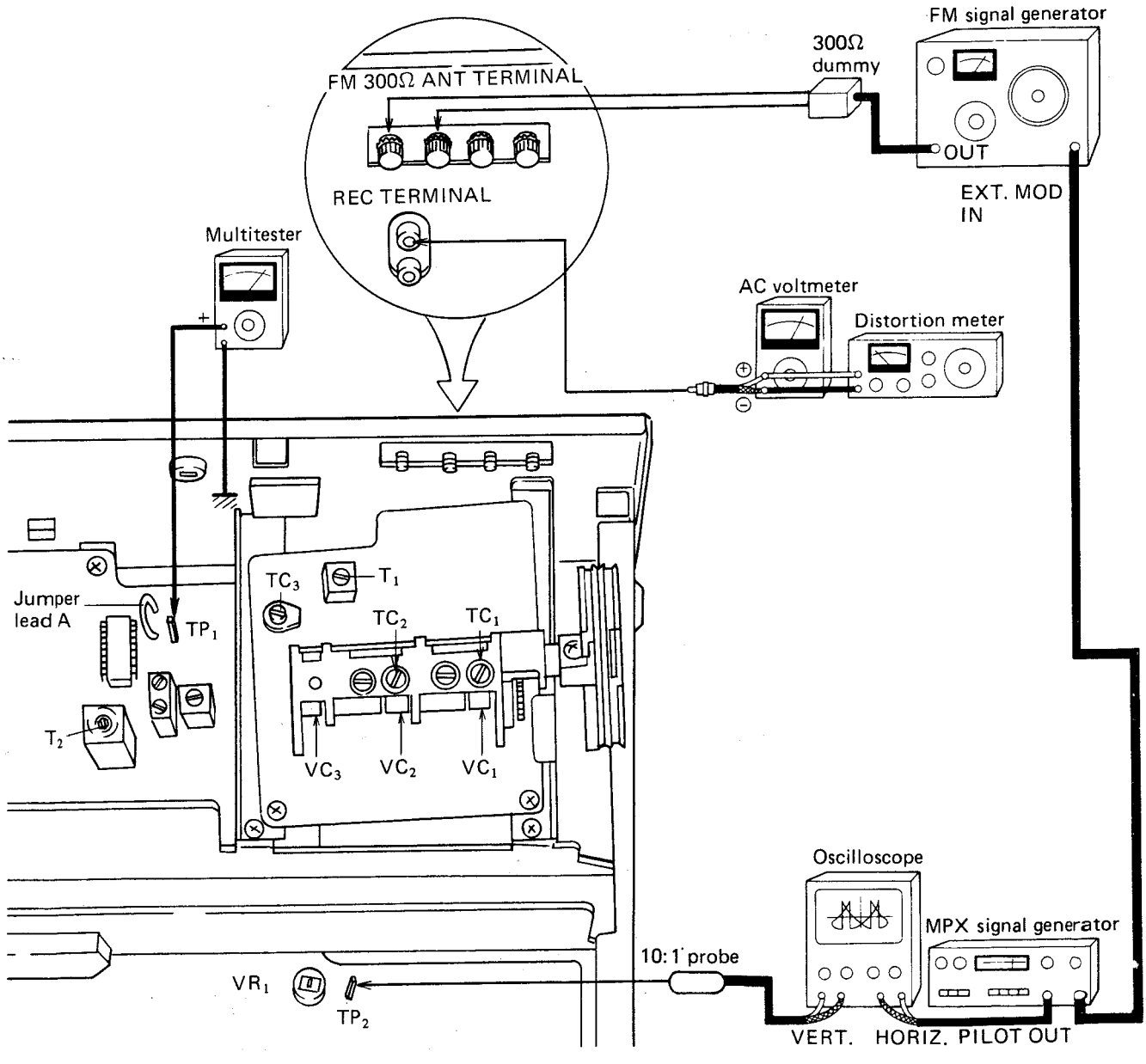


Fig. 7

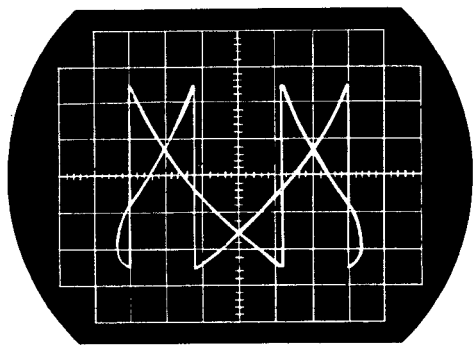
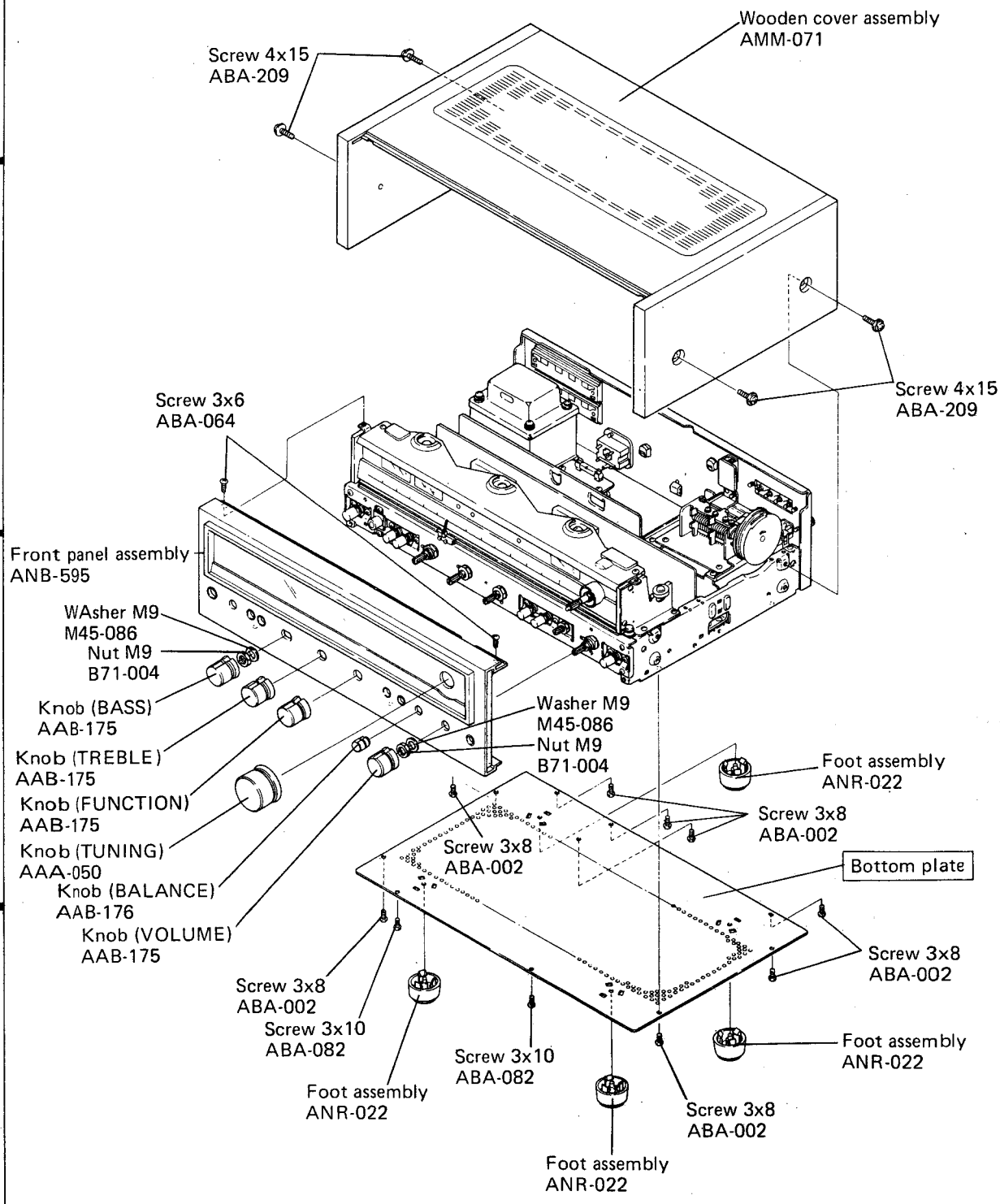


Fig. 8 Lissajous figure

9. EXPLODED VIEWS

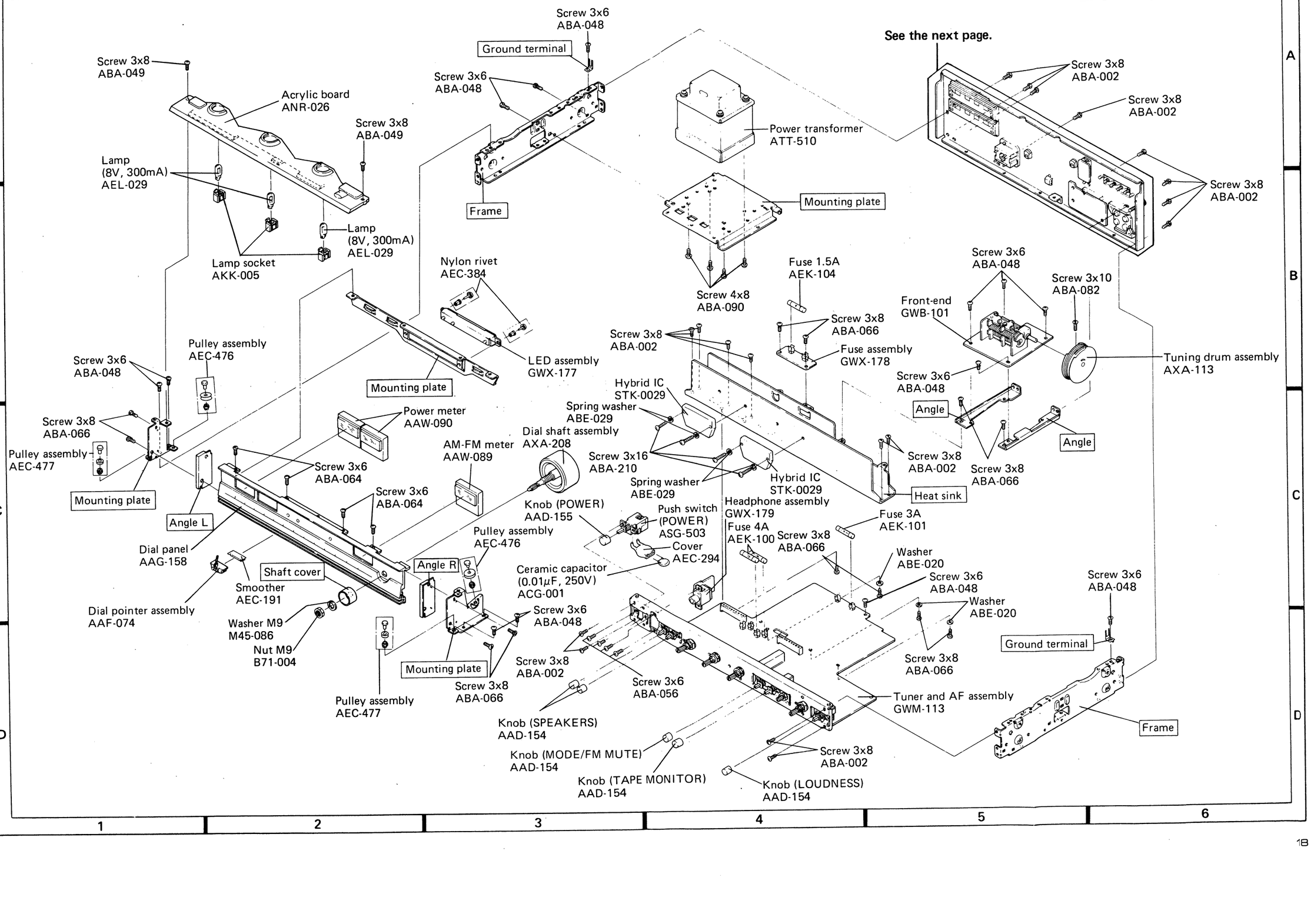
NOTE:
marked parts cannot be supplied.

9.1 EXTERNAL PART



9.2 INTERNAL PART

NOTE:
marked parts cannot be supplied.



P.C. BOARD ASSEMBLIES

Part No.	Description
GWM-113	Tuner and AF assembly
GWX-179	Headphone assembly
GWX-180	De-emphasis assembly
GWB-101	Front-end
GWX-181	Terminal assembly
GWX-178	Fuse assembly
GWX-177	LED assembly

OTHERS

Part No.	Symbol & Description	
ATT-510	T1	Power transformer
ATB-505	T2	Bar antenna
ASG-503	S8	Push switch (POWER)
AAW-089		AM-FM meter
AAW-090		Power meter
AKA-003		Terminal (ANTENNA)
AKE-031		Terminal (GND)
AKE-026		Terminal (SPEAKERS)
AKB-035		Terminal (INPUT)
AKP-004		AC socket
AKK-005		Lamp socket
ADG-023		AC power cord

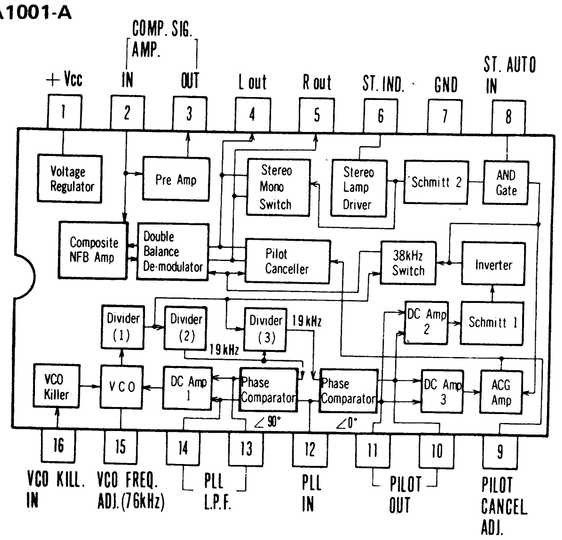
List of changed parts information will be furnished whenever necessary and you are requested to amend parts number in this parts list.

List of Changed Parts for Factory Modification

Symbol	Part No.	Description

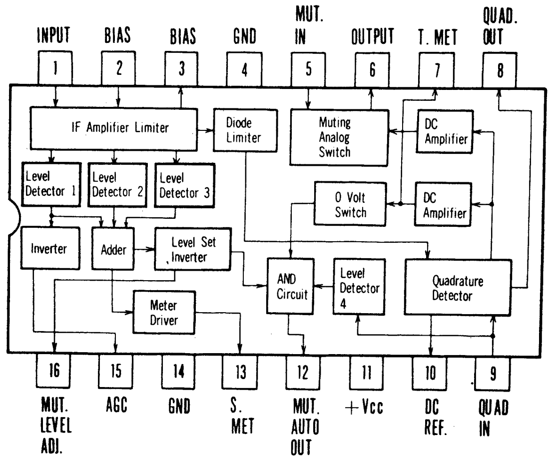
Block Diagram of ICs

PA1001-A



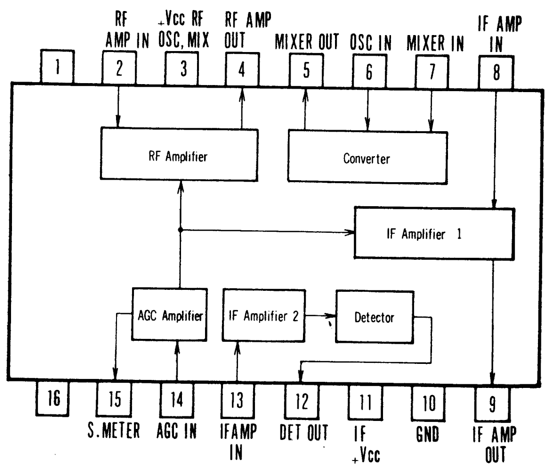
COMP. SIG. AMP.
+Vcc
IN
OUT
L out
R out
ST. IND.
GND
ST. AUTO IN
Voltage Regulator
Pre Amp
Stereo Mono Switch
Stereo Lamp Driver
Schmitt 2
AND Gate
Composite NFB Amp
Double Balance De-modulator
Pilot Canceller
38kHz Switch
Inverter
Divider (1)
Divider (2)
Divider (3)
19kHz
DC Amp 2
Schmitt 1
VCO Killer
VCO
DC Amp 1
Phase Comparator
Phase Comparator
DC Amp 3
ACG Amp
∠90°
∠0°
VCO KILL. IN
VCO FREQ. ADJ.(76kHz)
PLL L.P.F.
PLL IN
PILOT OUT
PILOT CANCEL ADJ.

PA3001-A

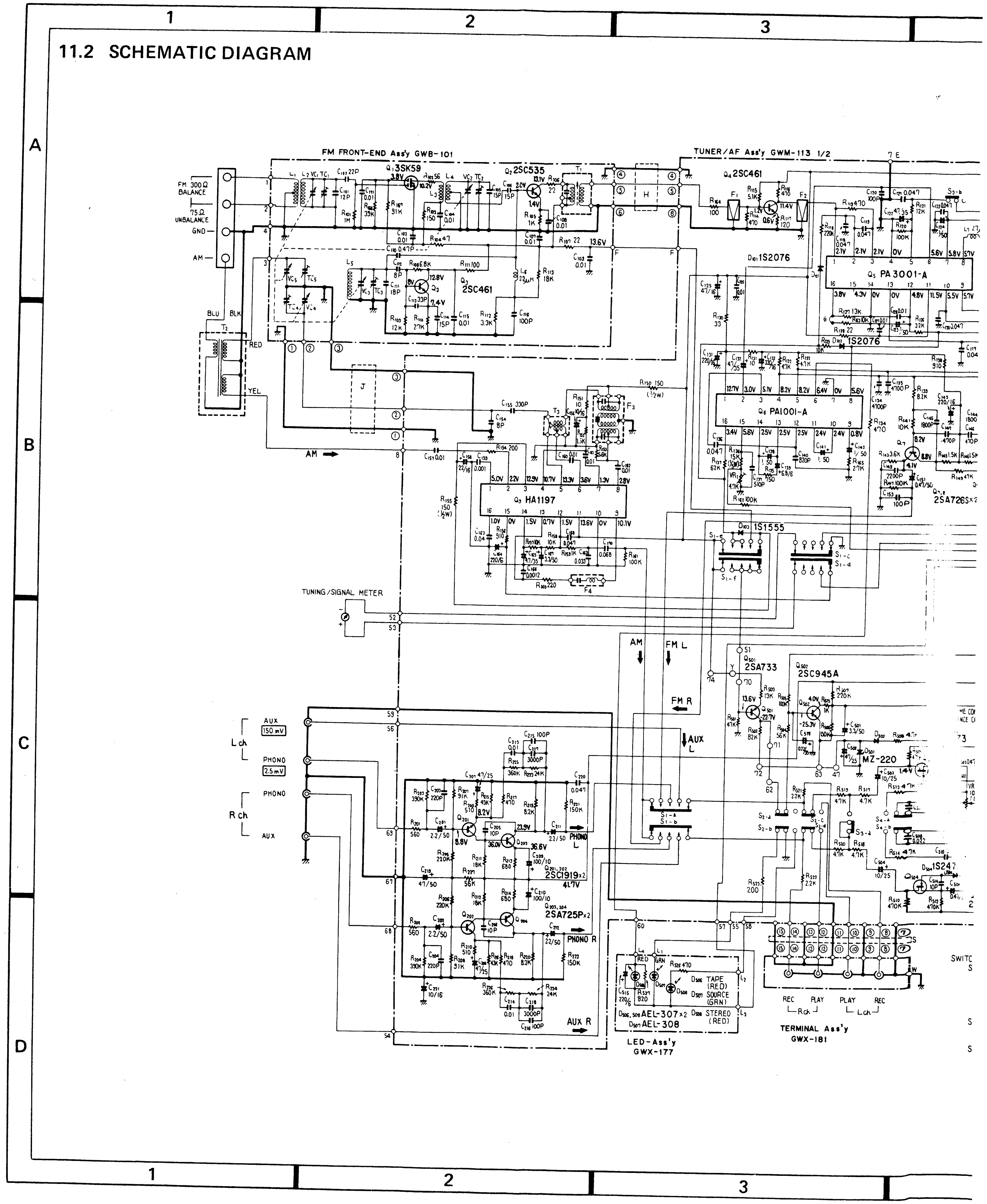


INPUT
BIAS
BIAS
GND
MUT. IN
OUTPUT
T. MET
QUAD. OUT
IF Amplifier Limiter
Diode Limiter
Muting Analog Switch
DC Amplifier
Level Detector 1
Level Detector 2
Level Detector 3
0 Volt Switch
DC Amplifier
Inverter
Adder
Level Set Inverter
AND Circuit
Level Detector 4
Quadrature Detector
Meter Driver
MUT. LEVEL ADJ.
AGC
GND
S. MET
MUT. AUTO OUT
+Vcc
DC REF.
QUAD IN

HA1197

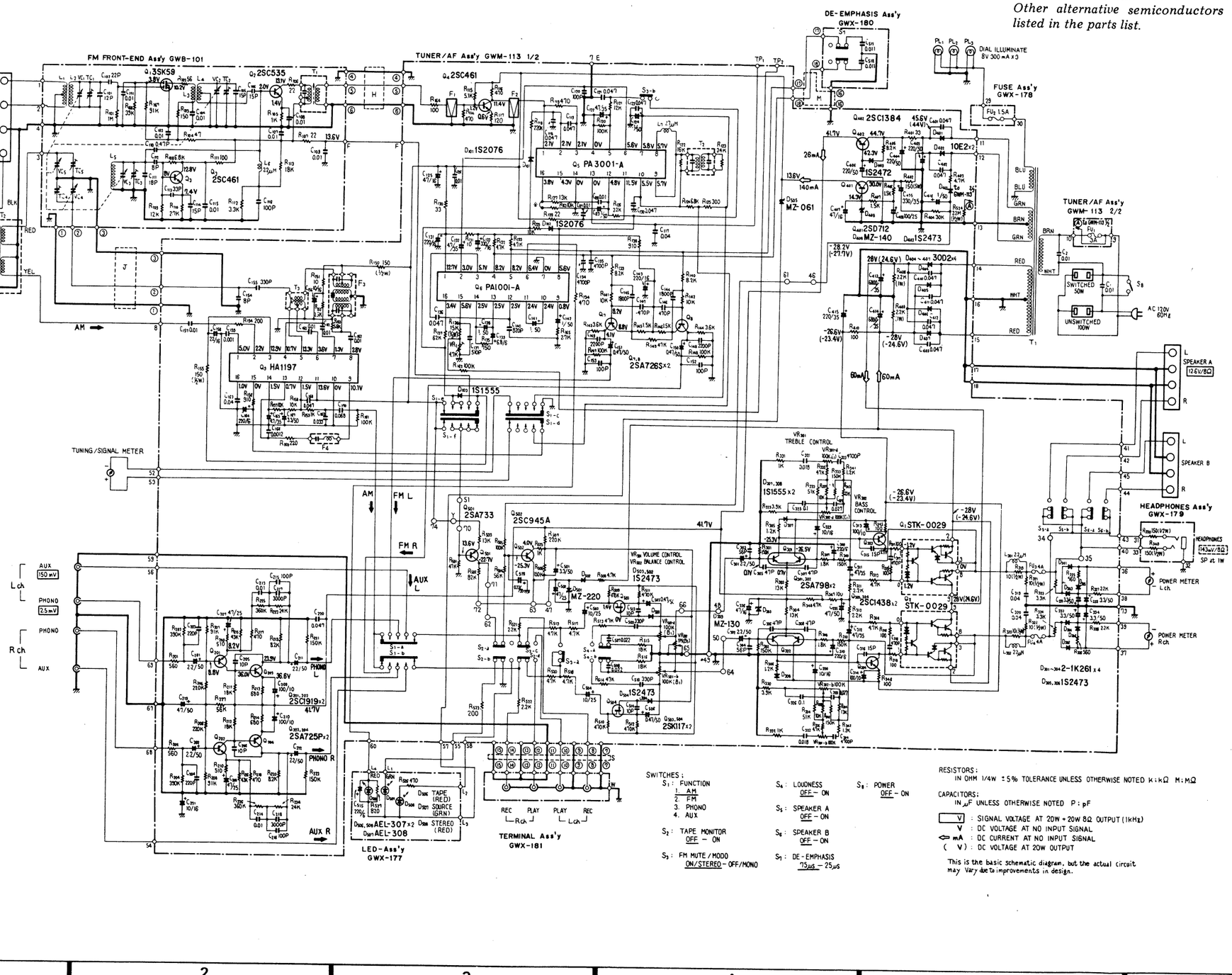


11.2 SCHEMATIC DIAGRAM

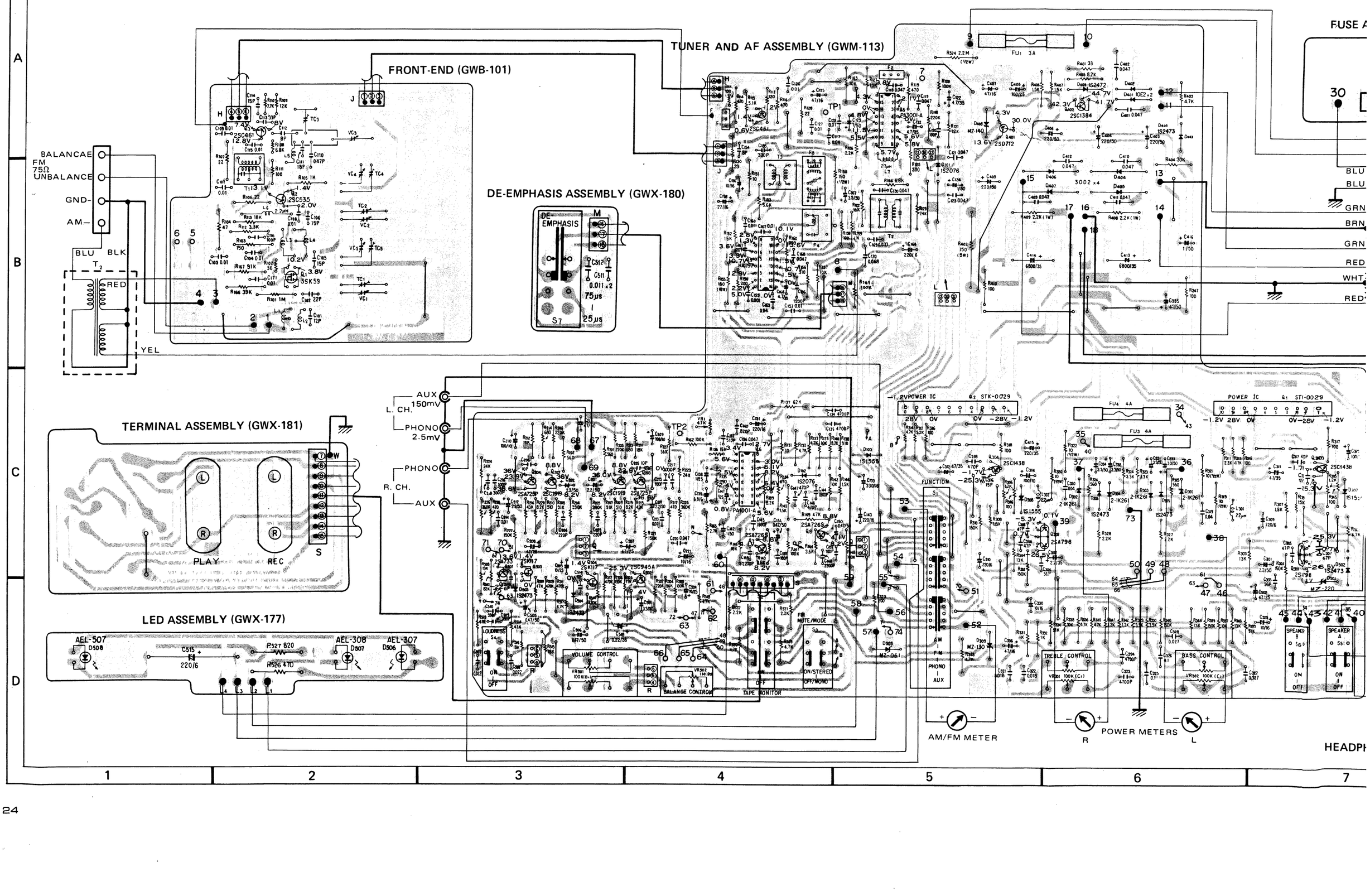


11.2 SCHEMATIC DIAGRAM

NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.


FM FRONT-END Ass'y GWB-101
TUNER/AF Ass'y GWM-113 1/2
DE-EMPHASIS Ass'y GWX-180
FUSE Ass'y GWX-178
DIAL ILLUMINATE 8V 300mA x3
TUNER/AF Ass'y GWM-113 2/2
TUNING/SIGNAL METER
LED-Ass'y GWX-177
TERMINAL Ass'y GWX-181
HEADPHONES Ass'y GWX-179
SPEAKER A 12.6V/8Ω
SPEAKER B
POWER METER Lch
POWER METER Rch
AUX 150mV
PHONO 2.5mV
PHONO
AUX
SWITCHES:
S1: FUNCTION 1. AM 2. FM 3. PHONO 4. AUX
S2: TAPE MONITOR OFF — ON
S3: FM MUTE/MODO ON/STEREO — OFF/MONO
S4: LOUDNESS OFF — ON
S5: SPEAKER A OFF — ON
S6: SPEAKER B OFF — ON
S7: POWER OFF — ON
S8: DE-EMPHASIS 75μs — 25μs
RESISTORS: IN OHM 1/4W ±5% TOLERANCE UNLESS OTHERWISE NOTED K:kΩ M:MΩ
CAPACITORS: IN μF UNLESS OTHERWISE NOTED P:pF
V : SIGNAL VOLTAGE AT 20W + 20W 8Ω OUTPUT (1kHz)
V : DC VOLTAGE AT NO INPUT SIGNAL
mA : DC CURRENT AT NO INPUT SIGNAL
(V) : DC VOLTAGE AT 20W OUTPUT
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

11.3 P.C. BOARD CONNECTION DIAGRAM



SX-580

TUNER AND AF ASSEMBLY (GWM-113)

FUSE ASSEMBLY (GWX-178)

DIAL ILLUMINATE
8V 300mA×3
PL_3 PL_2 PL_1

FU_1 3A

FU_2 1.5A

BLU
BLU
GRN
BRN
GRN
RED
WHT
RED
BRN
WHT

T_1

C_2 0.01
C_1 0.01
S_8
SWITCHED 50W
UNSWITCHED 100W

AC 120V 60Hz

SPEAKERS A
12.6V/8
L
R

SPEAKERS B
L
R

FU4 4A
FU3 4A

-1.2V POWER IC Q_2 STK-0029

POWER IC Q_1 STK-0029

FUNCTION
AM / FM / PHONO / AUX

TREBLE CONTROL
BASS CONTROL

SPEAKER B ON / OFF
SPEAKER A ON / OFF

HEADPHONES
R349 150 (½W)
R350 150 (½W)

AM/FM METER
POWER METERS R L

HEADPHONE ASSEMBLY (GWX-179)

TAPE MONITOR
FM MUTE/MODE
ON/STEREO OFF/MONO
BALANCE CONTROL

External Appearance of Transistors and ICs

2SC1919
2SA726S

2SA798

2SC535
2SC461

2SA733
2SC1438

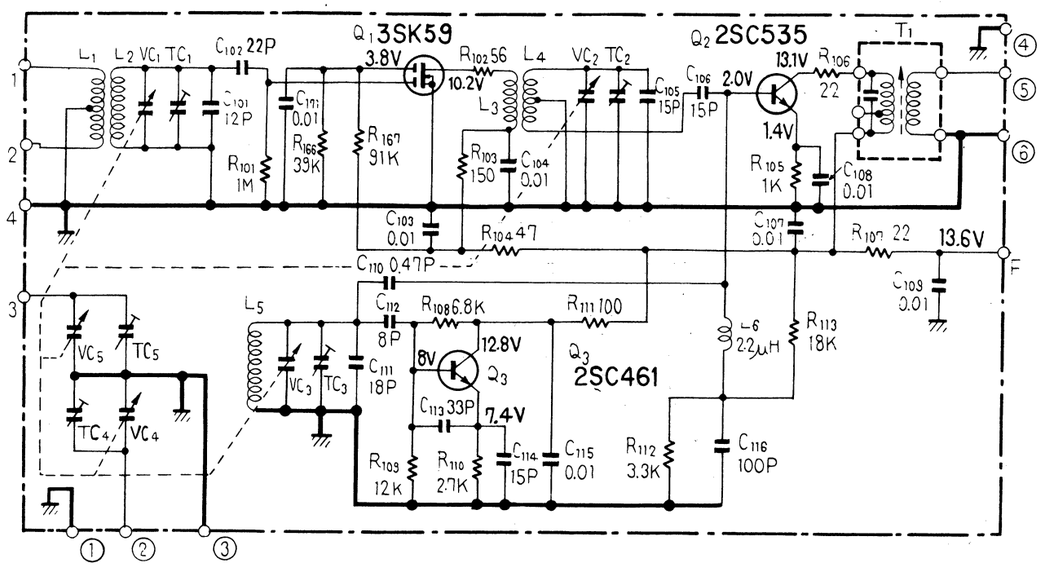
2SC1384

2SK117

3SK59

PA3001-A
PA1001-A
HA1197
Index

11.4 FRONT-END (GWB-101)



Parts List of Front-end (GWB-101)

SEMICONDUCTORS

Part No.	Symbol & Description
3SK59-Y or GR	Q1
2SC535-A or B	Q2
2SC461-B or C	Q3

TRANSFORMER AND COIL

Part No.	Symbol & Description	
ATE-039	T1	FM IF transformer
T24-028	L6	RF choke coil 2.2μH

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

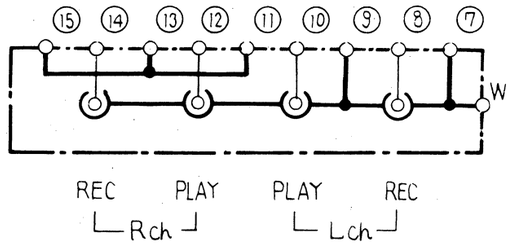
Part No.	Symbol & Description
RD¼PS □□□ J	R101, R103–R107, R113, R166, R167
RD¼VS □□□ J	R111, R102, R108–R110

CAPACITORS

Part No.	Symbol & Description
CCDUJ 120K 50	C101
CCDSL 220K 50	C102
CKDYF 103Z 50	C103, C104, C107–C109, C115, C171
CCDUJ 150K 50	C105
CCDSL 150K 50	C106
CGB R47K 500	C110
CCDPH 180K 50	C111
CCDLH 080F 50	C112
CCDCH 330K 50	C113
CCDCH 150K 50	C114
CCDSL 101K 50	C116

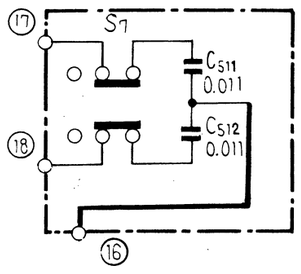
ACK-012	VC	Tuning capacitor
ACM-006	TC3	Ceramic trimmer

11.5 TERMINAL ASSEMBLY (GWX-181)



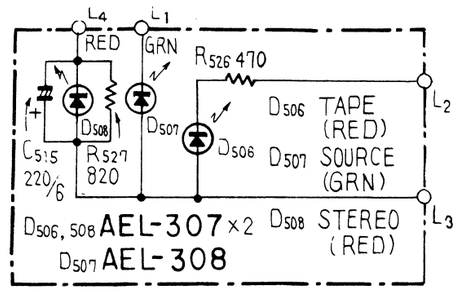
Part No.	Symbol & Description
AKB-045	Terminal (TAPE)

11.6 DE-EMPHASIS ASSEMBLY (GWX-180)



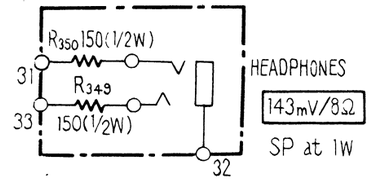
Part No.	Symbol & Description	
CQMA 113J 50	C511, C512	
ASH-015	S7	Slide switch (DE-EMPHASIS)

11.7 LED ASSEMBLY (GWX-177)



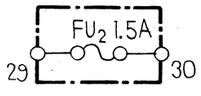
Part No.	Symbol & Description	
AEL-308	D507	LED
AEL-307	D506, D508	LED
RD¼PS 471J	R526	
RD¼PS 821J	R527	
CEB 221P 6	C515	

11.8 HEADPHONE ASSEMBLY (GWX-179)



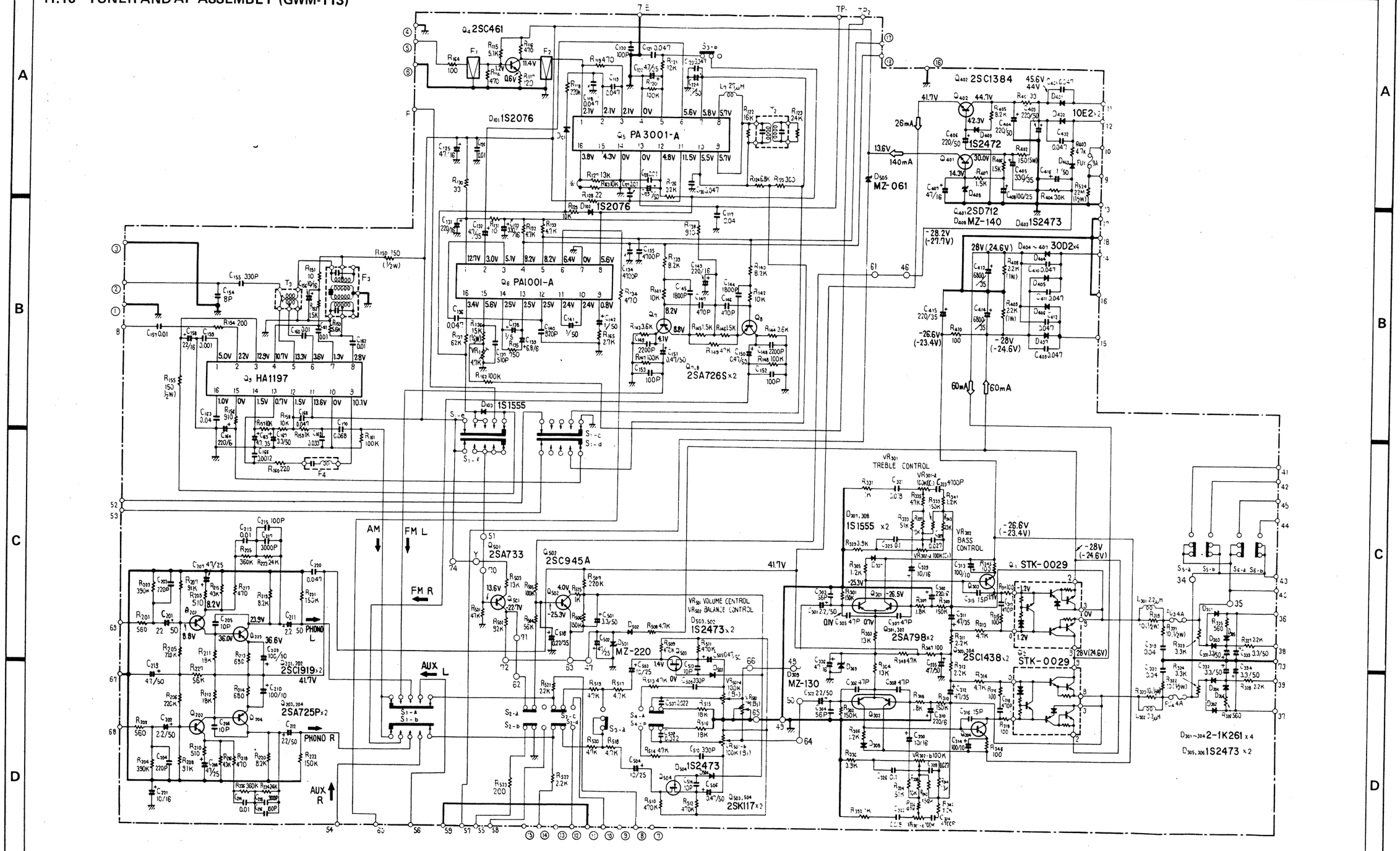
Part No.	Symbol & Description
RD½PS 151J	R349, R350
AKN-009	Phone jack

11.9 FUSE ASSEMBLY (GWX-178)



Part No.	Symbol & Description
AKR-013	Fuse clip

11.10 TUNER AND AF ASSEMBLY (GWM-113)



Parts List of Tuner and AF assembly (GWM-113)

SWITCHES

Part No.	Symbol & Description	
ASE-107	S1	Slide rotary (FUNCTION)
ASG-137	S2, S3	Dual push (TAPE MON., MODE/FM MUTE)
ASG-138	S4	Push (LOUDNESS)
ASG-139	S5, S6	Dual push (SPEAKERS)

TRANSFORMERS AND COILS

Part No.	Symbol & Description	
ATE-040	T2	FM transformer
ATB-013	T3	AM OSC coil
ATF-013	F1, F2	FM ceramic filter
ATF-034	F3	AM ceramic filter
ATF-038	F4	455kHz filter
ATH-022	L7	RF choke coil 27μH

CAPACITORS

Part No.	Symbol & Description
CKDYF 403Z 50	C117, C163
CKDYF 473Z 50	C118, C119, C123, C130, C168
CCDSL 101K 50	C120, C152, C153
CEA 4R7P 16	C122, C132, C165
CEA 010P 50	C124, C129, C142
CEA 470P 16	C125
CKDYF 103Z 50	C126–C128, C157, C160–C162
CEA 221P 16	C131, C143
CEA 331P 16	C133
CQMA 472J 50	C134, C135
CQMA 473K 50	C136
CQSH 511J 50	C137
CEANL 010M 50	C138, C141
CSZA 6R8M 6	C139
CKDYB 821K 50	C140
CKDYB 182K 50	C144, C145
CKDYB 471K 50	C146, C147
CKDYB 222K 50	C148, C149
CEA R47P 50	C150, C151
CCDXL 080F 50	C154
CQSH 331J 50	C155
CEA 100P 16	C156
CEA 220P 16	C158
CKDYB 102K 50	C159
CKDYB 122K 50	C166
CEA 3R3P 50	C167
CQMA 333K 50	C169
CQMA 683K 50	C170
CEA 221P 6	C164

Part No.	Symbol & Description		
CEANL 2R2P 50	C201, C202, C211, C212		
CCDSL 221K 50	C203, C204		
CCDSL 100F 50	C205, C206		
CEANL 470P 25	C207, C208		
CEA 101P 10	C209, C210		
CKDYA 103J 50 (CQMA 103J 50)	C213, C214		
CCDSL 101K 50	C215, C216		
CKDYA 302J 50 (CQMA 302J 50)	C217, C218		
CEA 470P 50	C219		
CKDYF 473Z 50	C220		
CEANL 2R2P 50	C301, C302		
CCDSL 560K 50	C303, C304		
CCDSL 470K 50	C305–C308		
CEA 220P 6	C309, C310		
CEA 470P 35	C311, C312		
CEA 101P 10	C313, C314		
CCDSL 150K 50	C315, C316		
CCDSL 471K 50	C317, C318		
CCDYF 403Z 50	C319, C320		
CQMA 183J 50	C321, C322		
CEANL 100P 16	C329, C330		
CEA 3R3P 50	C331–C334		
CEA 470P 50	C335		
CEA 470P 16	C336		
ACG-009	C401, C402, C409–412	Ceramic	0.047/150V
CEA 221P 50	C403, C404, C406		
CEA 470P 16	C407		
CEA 101P 25	C408		
ACH-201	C413, C414	Electrolytic	6800/35V
CEA 221P 35	C415		
CEA 331P 35	C405		
CEA 010P 50	C416		
CEA 3R3P 50	C501		
CEA 470P 25	C502		
CEANL 100P 25	C503, C504		
CEANL R47M 50	C505, C506		
CQMA 223J 50	C507, C508		
CCDSL 331K 50	C509, C510		
CCDSL 100K 50	C513, C514		
CSZA R22M 35	C518		

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

RESISTORS

Part No.	Symbol & Description
RD¼PS □□□J	R114–R135, R137–R149, R151–R154, R156–R163
RD¼PS □□□J	R201–R204, R209–R227
RD¼PS □□□J	R301–R318, R323–R348
RD¼PS □□□J	R403–R407
RF¼PS □□□J	R401, R410
RD¼PS □□□J	R501–R523, R525
RD¼PS □□□JNL	R205–R208

Part No.	Symbol & Description	
RN1/8SQ □□□□ F	R136	
RD1/4VS □□□ J	R164	
RD1/2PS □□□ J	R150, R155, R319, R320	
RT5B □□□ K	R402	
RS1P □□□ J	R408, R409	
RF1/2PS □□□ J	R321, R322	
ACN-029	R524	
ACV-186	VR301, VR302	Variable 100kΩ(BASS, TREBLE)
C92-051	VR1	Semi-fixed 4.7kΩ
ACV-161	VR501	Variable 100kΩ (VOLUME)
ACT-019	VR502	Variable 1MΩ (BALANCE)

SEMICONDUCTORS

Part No.	Symbol & Description
2SC461-B or C	Q4
PA3001-A	Q5
PA1001-A	Q6
2SA726S-G or F (2SA750-E or F)	Q7, Q8
HA1197	Q9
2SC1919-G or F (2SC1400-E)	Q201, Q202
2SA725P-F or G	Q203, Q204
2SA798-F or G	Q301, Q302
2SC1438-V or B	Q303, Q304
2SD712-C or D (2SD313-D or E)	Q401
2SC1384-Q or R	Q402
2SA733-Q or R	Q501
2SC945A-Q or R	Q502
2SK117-GR or Y (2SK34-C or D)	Q503, Q504
1S2076 (1S2473) (1S1555)	D101, D102
1S1555 (1S2473)	D103
2-1K 261	D301–D304
1S1555 (1S2473)	D307–D308
MZ-130 (WZ-130)	D309
10E2 (SIB01-02)	D401, D402
1S2473	D305, D306, D403, D502–D504
30D2 (GP-25D)	D404–D407
MZ-140 (WZ-140)	D408
1S2472 (1S1554)	D409
MZ-220 (WZ-220)	D501
MZ-061 (WZ-061)	D505

OTHERS

Part No.	Symbol & Description
AKH-014	IC socket
ANH-203	Heat sink
AKR-013	Fuse clip
ABN-047	Union nut
ABN-024	Washer faced nut

List of Changed Parts for Factory Modification

Symbol	Part No.	Description

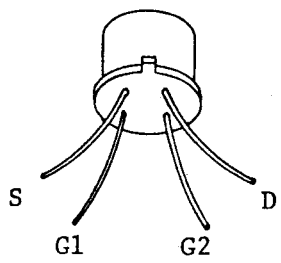
No. SI-A8044

MODEL: SX-580, SX-590, SX-680, SX-690, SX-780, SX-790, SX-880, SX-890, LX-590, LX-690

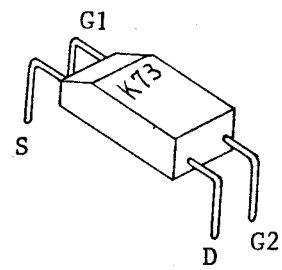
SUBJECT: Change of FET in the FM Front End or Tuner Assembly.

REASON: Convenience on procurement.

OLD	NEW
3SK59	3SK73

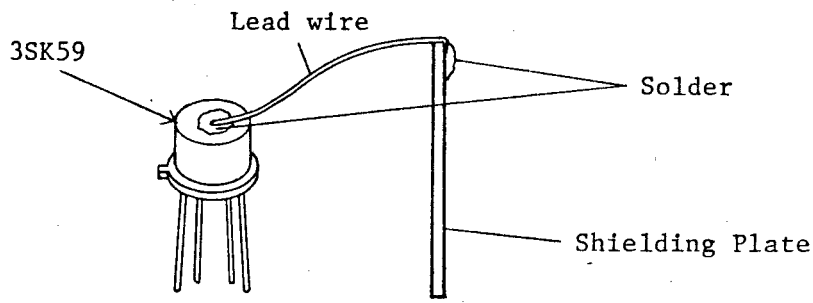


[Fig. 1]



[Fig. 2]

NOTICE: 1. Old and new FETs are interchangeable.
But, please remove the lead wire when you use 3SK73 instead of 3SK59, and add the lead wire when doing vice versa.



[Fig. 3]

2. Correction of Service Manual.

SX-580	[ART-288]	page 26	Please correct the External appearance of 3SK59 to that of Fig. 1 above.
SX-680	[ART-294]	page 18	
SX-780	[ART-289]	page 24	
SX-880	[ART-296]	page 31	

MODIFICATION CODE: 3

APPLICABLE MONTH: August 1978

No. SI-A8049

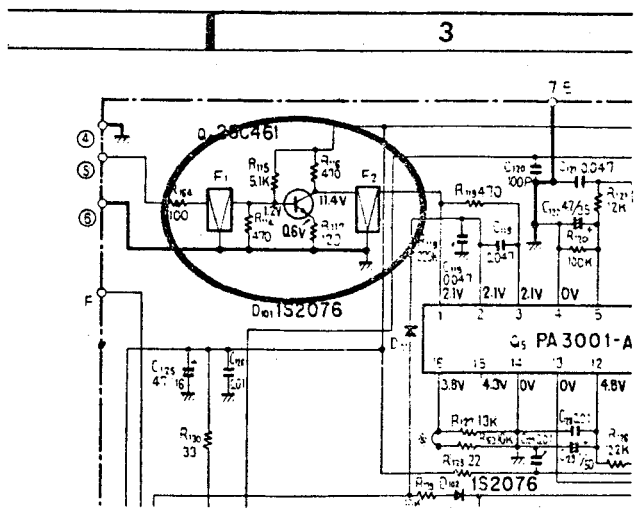
MODEL: SX-580, SX-680

SUBJECT: Change of FM ceramic filter in the Tuner and AF Assembly (SX-580 and SX-590) or Main Board Assembly (SX-680, and SX-690).

SX-580/KUΘ	GWM-113	SX-680/KUΘ	GWM-117
" /KCΘ	GWM-114	" /KCΘ	GWM-118
" /S, S/G	GWM-115	" /S, S/G	GWM-119
SX-590/HGΘ, HGW4	GWM-116	SX-690/HGΘ, HGW4	GWM-120
		LX-590/HGΘW4	GWM-122

REASON: To minimize the drift of tempetature.

F1, F2 : FM ceramic filter
ATF-013 ⟶ ATF-053



NOTICE: Old and new parts are interchangeable only those models.

SERVICE MANUAL PAGE:

SX-580/KU	[ART-288]	29	(GWM-113)
" /KC	[ART-306]	5	(GWM-115)
" /S, S/G	["]	15	(GWM-114)
SX-680/KU	[ART-294]	25	(GWM-117)
" /KC	[ART-307]	7	(GWM-118)
" /S, S/G	["]	15	(GWM-119)
SX-590/HG, HGW4	[ART-295]	9	(GWM-116)
SX-690/HG, HGW4	[ART-303]	9	(GWM-120)

APPLICABLE MONTH: July 1978

No. SI-A8052

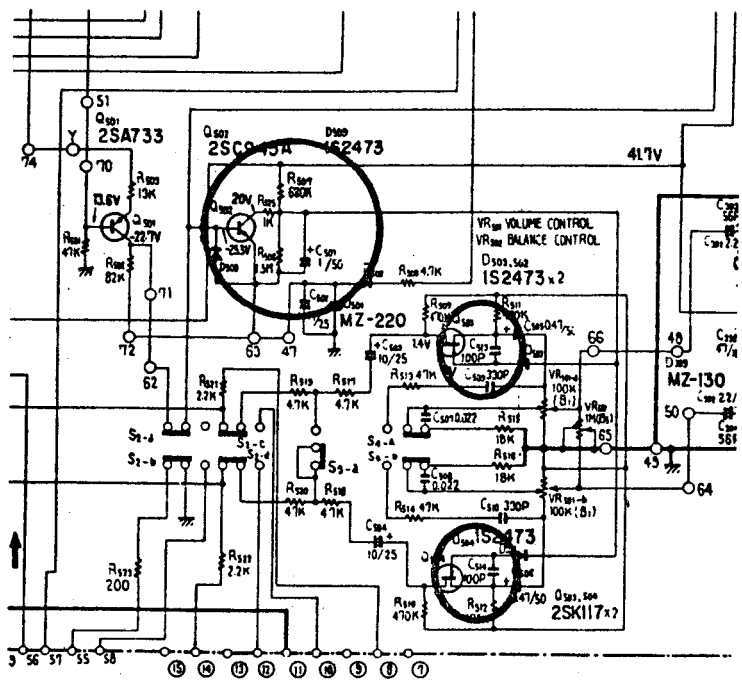
MODEL: SX-580/KU, SX-590/KU, HG, HGW4

SUBJECT: Circuit modification of Tuner and AF Assembly.

SX-580/KU	GWM-113
SX-590/KU,HG,HGW4	GWM-116

REASON: To increase the PHONO OVER-LOAD LEVEL, set the gate voltage of FET in the muting circuit higher.

C501	:	3.3μF 50V CEA3R3P50	→ 1μF 50V CEA010P50
R506	:	150KΩ RD1/4PS154J	→ 1.5MΩ RD1/4PS155J
R507	:	220KΩ RD1/4PS224J	→ 680KΩ RD1/4PS684J
C513, C514	:	10pF CCDSL100K50	→ 100pF CCDSL101K50



SERVICE MANUAL PAGE:

SX-580	[ART-288]	29, 30	(GWM-113)
SX-590	[ART-295]	9, 10	(GWM-116)

APPLICABLE SERIAL No. :

SX-580/KU	3608601
SX-590/KU,HG,HGW4	First lot∿

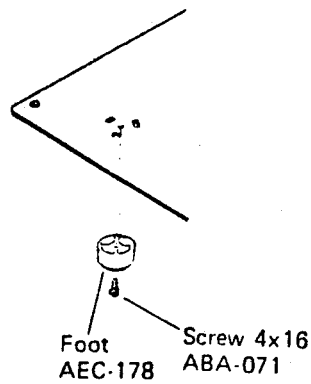
APPLICABLE MONTH: May 1978 (SX-580/KU, SX-590/HG⊖, HGW4)

No. SI-A8060

MODEL: SX-580, SX-590, SX-680, SX-690, LX-590/NG0W4, LX-690/HG0W4

SUBJECT: Information about Foot Assembly.

* AEC-178 is used only for the following Serial No.



APPLICABLE SERIAL No. :

SX-580/KU0	3602101	∿	3611101
" /KC0	First lot	∿	3402501
" /S	First lot	∿	2601401
" /S/G	First lot	∿	2900501
SX-590/HG0	First lot	∿	8400801
" /HG0W4	First lot	∿	8807501
LX-590/NG0W4	First lot	∿	4602601
SX-680/KU0	3602101	∿	3612101
" /KC0	First lot	∿	3402501
" /S	First lot	∿	2601601
" /S/G	First lot	∿	2902901
SX-690/HG0	First lot	∿	8400501
" /HG0W4	First lot	∿	8806001
LX-690/HG0W4	First lot	∿	8800701

No. SI-A8061

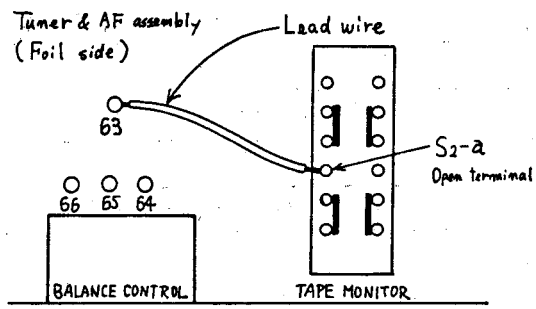
MODEL: SX-580, SX-590

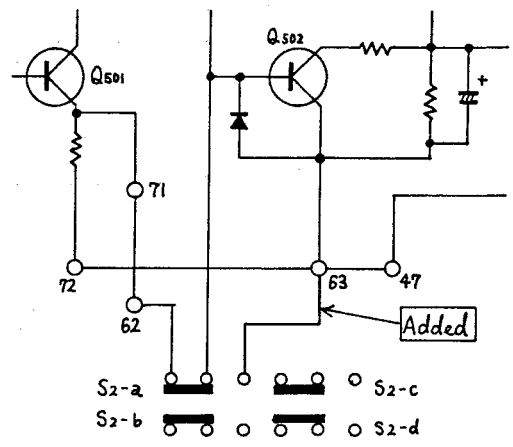
SUBJECT: Circuit modification of Tuner and AF Assembly.

SX-580/KU	:	GWM-113
SX-580/KC	:	GWM-114
SX-580/S,S/G	:	GWM-115
SX-590/HGW4	:	GWM-116

REASON: To prevent misoperation of AF muting cuicuit with decreased AC Power supply voltage at full power output when playing a tape (MONITOR ON).

COUNTERMEASURE: Add a lead wire.





NOTICE: Please do countermeasure on the units of the following Serial No. when AF muting cuiruit misoperates.

SX-580/KU	3606101	∿	3611100
" /KC	3400001	∿	3401500
" /S	2600001	∿	2600500
" /S/G	2900001	∿	2900500
SX-590/HGW4	8800001	∿	8803000

Those units after the numbers have been modified.

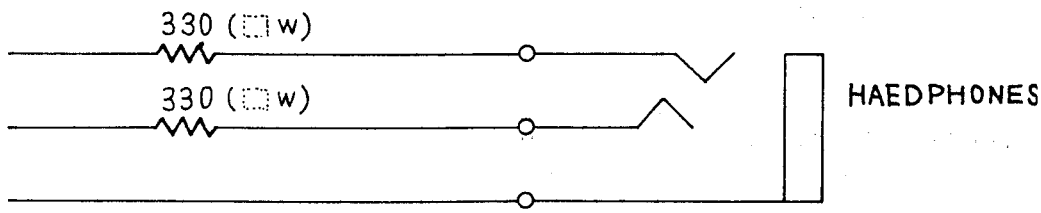
No. SI-A8068

MODEL: SX-580, SX-590, LX-590, SX-680, SX-690, LX-690, SX-780, SX-790 SX-880, SX-890, SX-980, SX-1080, SX-1280, SX-1980, A-27, SPEC-1

SUBJECT: Change of resistors at headphones output.

REASON: Protecting headphones.

OLD (150Ω)		NEW (330Ω)		Applicable Model
Part No.	W	Part No.	W	
RD1/2PS151J	1/2	RD1/2PS331J	1/2	SX-580,SX-590,LX-590
RD1/2PS151J	1/2	RS1P331J	1	SX-680,SX-690,LX-690
RS2P151J	2	RS1P331J	1	SX-780,SX-790
RS3P151J	3	RS1P331J	1	SX-880,SX-890
RS3P151J	3	RS2P331J	2	SX-980,SX-1080
RS3P151J	3	RS3P331J	3	SX-1280,SX-1980
RT5B151J	5	RS2P331J	2	A-27
RT5B151J	5	RS3P331J	3	SPEC-1



NOTICE: Please replace 2pcs. together when you use 330Ω instead of 150Ω.

APPLICABLE MONTH: January 1979

No. SI-A3069

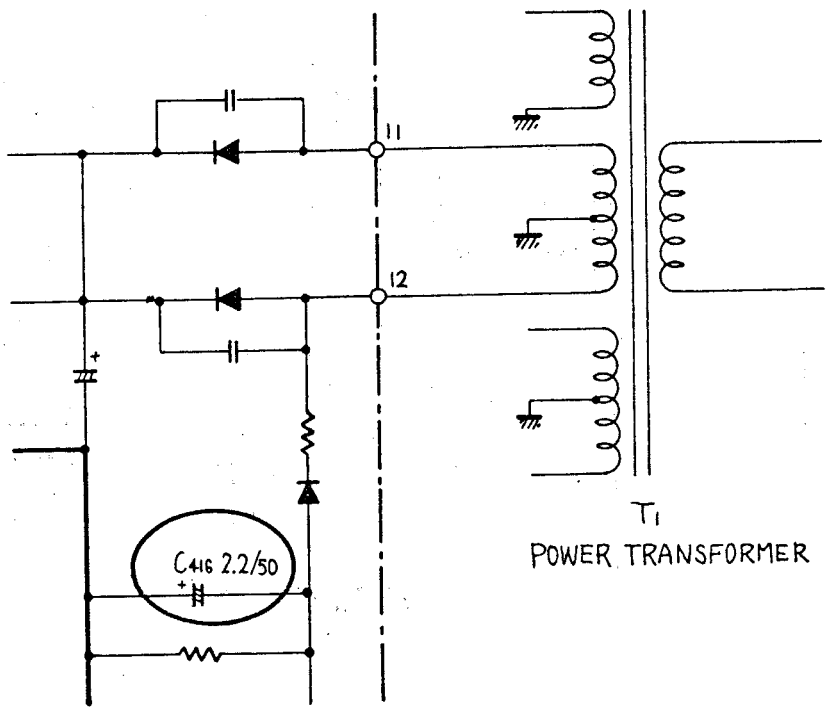
MODEL: SX-580, SX-590

SUBJECT: Circuit modification of Tuner and AF Assembly.

GWM-113	:	SX-580/KU, SX-590/KU
GWM-114	:	SX-580/KC
GWM-115	:	SX-580/S, S/G
GWM-116	:	SX-590/HG, HGW4
GWM-122	:	LX-590/NGW4

REASON: To prevent misoperation of AF muting circuit at low AC voltage.

C416 : 1μF 50V ⟶ 2.2μF 50V
CEA010P50 CEA2R2P50



APPLICABLE MONTH: September 1978 (GWM-113, 114)
December 1978 (GWM-115, 116, 122)

No. SI-A8088

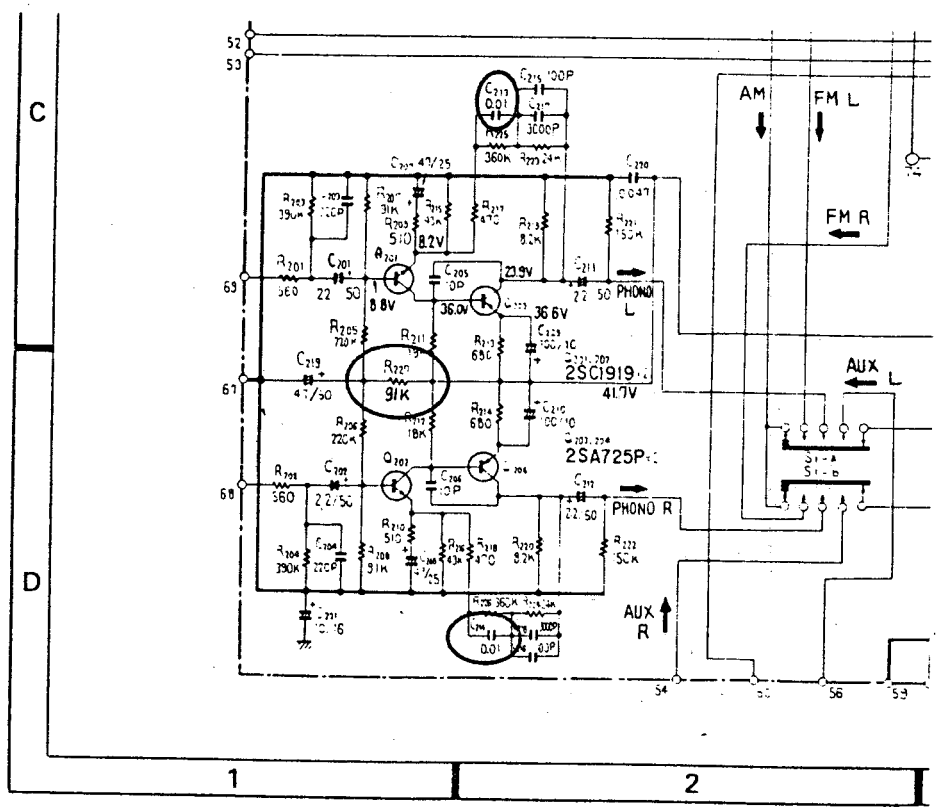
MODEL: SX-580, SX-590, LX-590

SUBJECT: Circuit modification of Tuner and AF Assembly.

GWM-113	:	SX-580/KU, SX-590/KU
" -114	:	SX-580/KC
" -115	:	SX-580/S, S/G
" -116	:	SX-590/HG, HGW4
" -122	:	LX-590/NGW4

REASON: To increase PHONO overload level.

R227	:	56KΩ RD1/4PS563J	→ 91KΩ RD1/4PS913J
C213, C214	:	0.01μF CKDYA103J50	→ 0.01μF CQMA103J50



29

APPLICABLE MONTH:

SX-580/KU, SX-590/KU	:	December 1978
SX-580/KC	:	December 1978
SX-580/S, S/G	:	October 1978
SX-580/HG, HGW4	:	October 1978
LX-590/NGW4	:	November 1978

No. SI-A8090

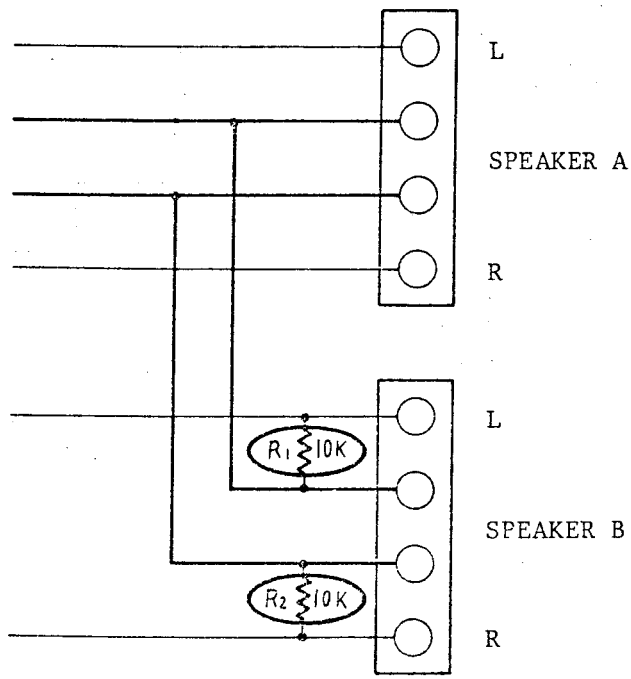
MODEL: SX-580, SX-590, SX-680, SX-690

SUBJECT: Circuit modification of AF OUTPUT block.

REASON: To reduce residual noise (hum).

Hum is induced on the speaker lines as the AC lines and speaker output lines are being wired in parallel.
Then, it jumps into the power amplifier input which is closely located.

R1, R2 : (Added) ——→ 10KΩ
RD1/4PS103J



APPLICABLE SERIAL NO. :

SX-580/S	2600501~	SX-680/S	2600501~
" /S/G	2900501~	" /S/G	2900901~
SX-590/HG	First lot~	SX-690/HG	First lot~
" /HGW4	8804501~	" /HGW4	8804001~
LX-590/NGW4	4601001~		

NOTICE: The resistors were deleted when the assembly pattern was modified and the speaker output was equipped further from the power amplifier input.

APPLICABLE SERIAL NO. :

SX-580/S	2601051~	SX-680/S	2601201~
" /S/G	2900501~	" /S/G	2901951~
SX-590/HG	8400501~	SX-690/HG	8400351~
" /HGW4	8806051~	" /HGW4	8805301~
LX-590/NGW4	4602051~		

No. SI-A8098

MODEL: SX-580/KU, S, S/G, SX-590/KU
SX-680/KU, S, S/G, SX-690/KU

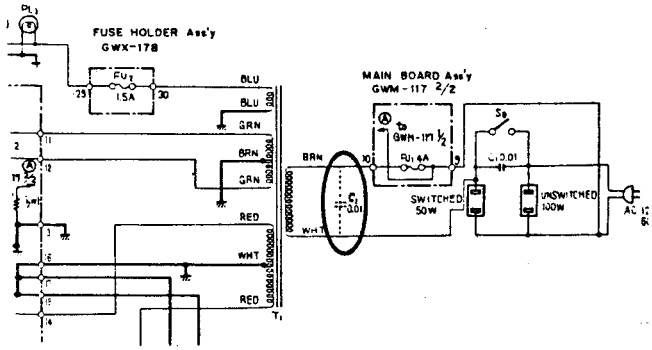
SUBJECT: 1. Deleted capacitor of line cross.
2. Circuit modification of Main board assembly. (except SX-580, 590)

SX-680/KU, SX-690/KU : GWM-117
SX-680/S, S/G : GWM-119

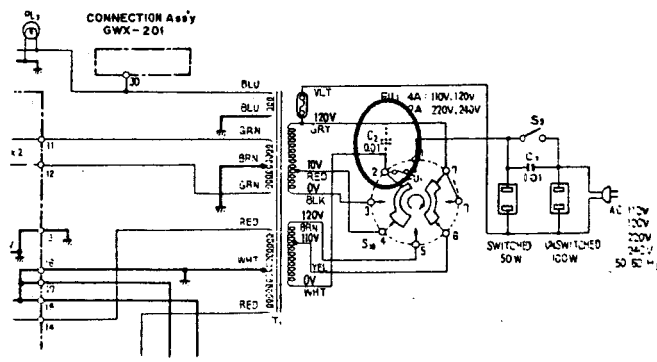
REASON: Cost down.

[1] Line cross capacitor

KU Model



S, S/G Model



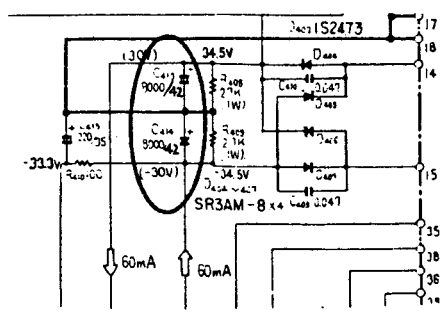
[2] Main board assembly (SX-680, SX-690)

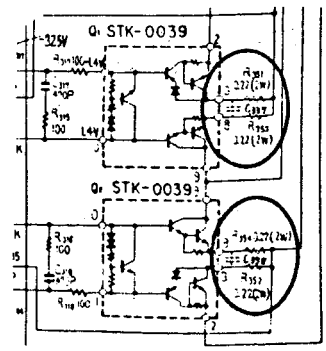
C413, C414 : 8000μF 50V ⟶ 8000μF 42V
ACH-082 ACH-203

R351, R352, R353, R354 : 0.22Ω ⟶ Jumper
ACN-030

C337, C338 : 0.047μF 150V ⟶ Delete
ACG-009

C401 : 0.047μF 150V ⟶ Delete (Only KU Model)
ACG-009





No. SI-A8101

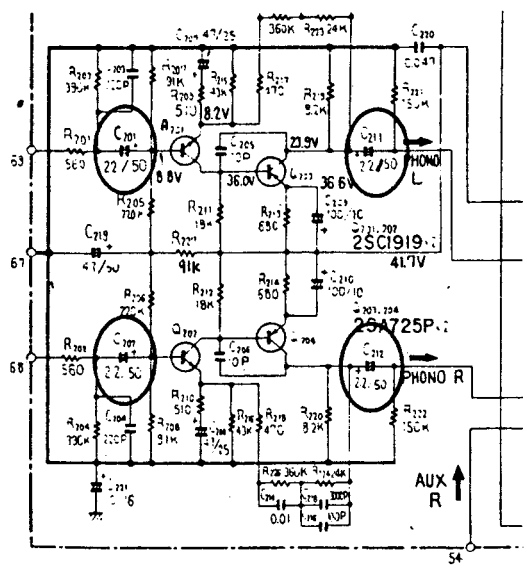
MODEL: SX-580, SX-590, LX-590, SX-680, SX-690, LX-690

SUBJECT: Circuit modification of Tuner and AF assembly or Main board assembly.

GWM-113	:	SX-580/KU, SX-590/KU
GWM-114	:	SX-580/KC
GWM-115	:	SX-580/S, S/G
GWM-116	:	SX-590/HG, HGW4
GWM-122	:	LX-590/NGW4
GWM-117	:	SX-680/KU, SX-690/KU
GWM-118	:	SX-680/KC
GWM-119	:	SX-680/S, S/G
GWM-120	:	SX-690/HG, HGW4
GWM-123	:	LX-690/NGW4

REASON: To reduce noise at PHONO position.

C201, 202, 211, 212	:	2.2μF	⟶	2.2μF
		CEANL2R2P50		ACH-309



APPLICABLE MONTH:

KU, KC Model ----------	February 1979
S, S/G, HG, HGW4, NGW4 ---------	January 1979

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